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AMERICAN INDIANS IN THE PACIFIC

By Thor Heyerdahl

THE KON-TIKI EXPEDITION

Stone statue at Tiahuanaco, Bolivia. (Photo: *Toucan Press-Wegeesch.*)

AMERICAN INDIANS IN THE PACIFIC

The Theory behind the Kon-Tiki Expedition

by

THOR HEYERDAHL

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TO MY MOTHER

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ABBREVIATIONS IN CAPTIONS TO ILLUSTRATIONS

Amer. Mus. Nat. Hist. = American Museum of Natural History, New York.
B.C. Gov. Trav. Bur. = British Columbia Government Travel Bureau, Victoria, B.C.
B.P. Bishop Mus. = Bernice P. Bishop Museum, Honolulu.
Mus. f. Völkerkunde = Ehem. Staatliches Museum für Völkerkunde, Berlin-Dahlem.
Mus. Anthrop., Univ. B.C. = Museum of Anthropology, University of British Columbia.
(For further abbreviations see page 765.)

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INTRODUCTION

THE POLYNESIAN PROBLEM

THE POLYNESIAN PROBLEM

The question to be dealt with in the present work is that of the complex origins of the Polynesian people, the easternmost islanders of the Pacific. This question is indeed neither new nor unattempted, as it arose with the European discovery of the Pacific island world and has since provoked a continual series of theories almost as rich in variety as in number.

The present work is no exception in this respect, as it presents material in support of yet another diverging answer to the same old question. It differs, however, to my knowledge, from all the rest in being the first systematic attempt to turn face to the winds and examine the bordering slopes of the New World for vestiges indicating the route of man into the open Pacific.

In itself, an attempt to adopt the Americas rather than the Old World in a study of Polynesian origins, is a break with the usual procedure and orthodox way of thinking, and such an approach to the problem may at first sight seem to overlook or ignore known facts and well established principles in Pacific ethnology. Let us not pass such a judgement in advance, until the arguments in favour of westward migration have here for the first time been fully assembled and reviewed. Let it be borne in mind that, as long as there still are unsolved problems in the Pacific, we should at least give an open mind to the consideration of any solution however unimpressive it may at first seem to be. Geographically speaking, not less than half of the inhabited area bordering on Polynesia is to the east of the islands, in the New World. We need no other excuse to bring America into the picture in a survey of available routes into the East Pacific.

To the scientist as well as to the general reader, the Polynesian nation has made a strong appeal. No other aboriginal tribes, and few of the early civilizations, have received so much attention in literature, technical papers and popular travel stories alike.

The general reader has shared the scholar's interest in the unusual problems connected with the Polynesian past. The fact that a stone age people, more like ourselves than most aboriginal people, was discovered in recent centuries on tiny islands in the midst of the largest of all seas, has stimulated the imagination and puzzled the mind. It was but natural even for the most casual observer to ask who they were, and why and how they had ended up on far-flung islands isolated by thousands of miles from any continent, and with no apparent relatives abroad.

Living on tiny oceanic islands scattered widely over an ocean territory four times the area of Europe, this people, termed by us the Polynesian, had settled exclusively at the windward extremity of the Pacific, on all the islands facing the trade winds and the New

World. The western boundary of Polynesia is marked by a nearly straight line from Hawaii to Samoa and New Zealand. Beyond these islands to the west dwell the peoples of Micronesia, Melanesia and Australia. To the east the Polynesian boundary is marked by the open sea washing the American coast. But what was the former territory of the stray Polynesian islanders?

The general reader has been left with an impression that the Polynesians somehow are of Malay stock, and that only some details have to be cleared up for the eastward migration of the Polynesian ancestry to be successfully reconstructed.

In default of any better or more plausible explanation, little effort has been made by the scholar to refute this opinion and to emphasise the fact that nobody really knows. There is the strongest disagreement among those who have personally been engaged in attempts to find a feasible answer to the problem. But since the Malay theory was first advanced some two hundred years ago, no more convincing solution has attracted the public. In the meantime the Polynesian scholars have pursued their research and speculations as to the full identity and migratory route of the Polynesian people.

Is there a Polynesian problem?

It has been asked: Is there any longer a Polynesian problem? Is there in Pacific anthropology even in our day need for further comparative studies founded on additional research in new and different geographical areas?

Sullivan (1923, p. 211), the leading authority on Polynesian physical anthropology, gave the following answer: "There are those who claim that there is no Polynesian problem. Yet a search through the available literature leaves one completely at sea, not only as to the racial affinities of the Polynesians but even as to their physical characteristics. There are the greatest apparent discrepancies in the descriptions by different writers."

Before any attempt at reconstruction is made, a brief summary of previous theories and opinions may give an appropriate foundation for further study, and serve to illustrate Sullivan's statement.

The early explorers, as will be seen later, unanimously describe the newly discovered Polynesians as already being of strongly mixed race. Furthermore, from their own personal experience in sailing ships, all early voyagers agreed that the only natural entrance to these hidden oceanic islands was with the trade winds from the east. Captain Cook, although stressing this point as much as all the others, was still perhaps one of the first to point to the west, as he observed that some Malay words were akin to words found in Polynesia. America was still occasionally suspected as a possible alternative for Polynesian origins in the days of Zuñiga (1803), Ellis (1829), and Lang (1834), but from now on, the whole attention of scholars was turned to the west, to the "leeward" of the ocean.

Theories of Polynesian origins

Quatrefages (1866) came to the final conclusion that the Polynesians came from Bouro (Boeroe Island) west of Céram, and migrated eastwards across the Pacific to their present domain on the islands next to America.

Huxley (1870), like Saint-Hilaire, Flower, Topinard, and Peschel, classes the Polynesians as mongoloid, but he also adds (p. 407): "... it becomes an interesting problem how far the Polynesians may be the product of a cross between the Dyak-Malay and the Negrito elements of the population of that region".

Wallace (1870, p. 411), who in all other respects agreed with Huxley's classification of mankind, differed only in regard to the origin of the Polynesians, stating that they appeared to him "to be much more nearly related to the Papuans than to the Malays, and should therefore be classed as Negroid instead of Mongoloid."

Thomson (1871, pp. 30, 48) says of the Polynesians that: "*They are a mixed race*, and may be divided into brown, reddish, and black." After a linguistic analysis he affirms: "Barata, South India, was, therefore, the Whence of the Maori [Polynesian]."

Shortland (1875, p. 338) believes that some migrants from India must have entered Celebes and there partly intermarried with an early prehistoric Papuan type, before pushing on into the East Pacific as Polynesians.

Colenso (1875, p. 405 etc.) strongly opposes the theory of a Polynesian kinship with the Malays, and after indicating a more likely relationship in Madagascar or Central America, he puts forward the hypothesis that the Polynesians may be autochtonous to their own insular habitat in the East Pacific. He admits, however, that "the origin of the Polynesian race is a problem that has yet to be solved—".

About this time still another and equally divergent theory on Polynesian origin arose, rejecting the claims both for Mongol and Negrito descent, and insisting that the Polynesians like ourselves, belonged to the Caucasian or White race.

Suggestions to this effect had already been made by several of the early discoverers, and were taken up by Bopp (1841) on a linguistic basis. Later, as Sullivan (1923, p. 211) states: "This view has also been adopted by Fornander (1870), Fenton (1885), Gill (1876), Tregear (1904), Giddings (1909), Percy Smith (1910), Brown (1907), and most students of Polynesian ethnology and linguistics. Brown in particular insists upon the nordic affinities of the Polynesians."

Fornander (1878, Vol I, p. 2), one of the earliest defenders of this theory, held that the Polynesians must have been of an Aryan stock which for long ages was influenced by a Cushite civilization before they left Southern Arabia on their long migrations through the Old World and into the East Pacific.

Tregear (1886), also finding the Polynesian speech-material to permit theories of distant wanderings, first traced the islanders back to India and then linked their ancestry up with peoples of western Europe and even Iceland.

Volz (1895) took the very opposite view and held that the Polynesians are related to their dark-skinned and negroid Melanesian and Australian neighbours.

Ripley (1899) considers the Polynesians to be of mixed origins, being mongrels between straight-haired Asiatic races and frizzled Melanesians.

Brigham (1900, p. 22) points to the complete confusion in Polynesian ethnology, and admits that the problem is difficult: "Let the theories await more complete knowledge: In the meantime all theorists in this domain are helping towards a final solution."

Thompson (1905—06), in his Maori Record articles, claims that the Polynesians are one of the purest of all known races. He suggests that they are a Caucasian people of the

Alpine branch which reached the sea at the Persian Gulf, and acquired the art of seamanship from the Phoenicians before they pushed on again to Polynesia by way of Sumatra. (See Best 1923 b.)

Macdonald (1907) attempted to prove a Semitic origin.

Keane (1908, p. 417), writes: "That they are one people is obvious and that they are an Oceanic branch of the Caucasian division is now admitted by all competent observers, . . ."

Smith (1910) believes the Polynesians to have originated in North Africa and migrated to Polynesia from India.

Oetteking (1914—15) admits that the racial relations of the Polynesians in Oceania are obscure.

Dixon (1921) rejects the theories of pure race in Polynesia, and finds these eastern islanders to be composed of fundamental types of Negrito, Melanesian, White, and Malayan or Mongoloid origins.

Perry (1923, p. 230) believes the Polynesians to have come from Egypt.

Christian (1923, p. 526) says: "And this is what the Maori and his brother Polynesian really seems to be: about three-fourths Aryan, with a touch of ancient Phoenician and South Arabian blood and a tincture of Mongolian Malay and a certain tinge of Visayan culture from the southern Philippines, which appear to have been the starting-off point. . ."

Sullivan (1923) shows that Giuffrida-Ruggeri held the Polynesians to be an offshoot of the Yellow race, whereas Safford finds them related to the inhabitants of the Moluccas and Celebes. Logan (according to Best, 1923 b) gave it as his opinion that they had derived from the ancient Gangetic race of India.

Best (1923 b) reviews the theories of Polynesian migration respectively from Egypt, Babylonia and the continent of south-eastern Asia, and seems to favour the latter area, although he points to certain parallels in ancient Ur.

Linton (1923, p. 465) holds that Polynesia was first settled by a negroid race from Melanesia, which "entered the region largely as a result of accidental drifts" and settled in this manner the islands eastwards as far as the Tuamotu group. Next, he says, came people of the White or Caucasic race: "While the main body of the Caucasic immigrants were passing through Micronesia another group of the same race were coasting southward through Melanesia." After them again he believes that Indonesians swept into the East Pacific: "They came from Indonesia, like the Caucasic immigrants, and passed by way of Micronesia." He concludes: "The conditions in Polynesia are extremely complex, and the migration theory just outlined . . . probably errs on the side of simplicity."

In another place the same author states (Linton and Wingert 1946, pp. 11, 22): "The ancestors of the Polynesians unquestionably came from Indonesia", but the migration details "are still unknown".

Haddon (1923, p. 224) finds the Polynesians to be most closely related to some megalithic culture of sun-worshippers. "This civilization can be traced to Indonesia, but it did not originate there, and evidence has been adduced to show that we may look to Ancient Egypt for its ultimate origin, as Elliot Smith first pointed out, and as Perry has argued. . ." Elsewhere (1924) he suggests that the early Polynesian home was "perhaps somewhere in Eastern India", and that their present type developed en route possibly through mixture among proto-Malay, Indonesian and Melanesian tribes. His own conclusion is (1924,

p. 123): "We are not yet in a position to discuss the racial anthropology of the Polynesians, who admittedly are of mixed origin."

Skinner (1924, p. 242) finds that some aspects of the Polynesian culture point to an origin in India, others to south-east Asia.

Brown (1924, p. 54) does not find any of the Asiatic suggestions to be tenable, and in rejecting them all he is led to take refuge in speculative theories of geological disturbances: "All the indications point to an empire in the east Central Pacific having gone down."

Rickard (1932, p. 21) is surprised to read in a British Museum handbook of 1925 that "the Polynesians were originally an inland people of Caucasic affinities, living in or near the valley of the Ganges", whence "they proceeded through the Molucca Straits and down the north coast of New Guinea", to Polynesia; while at the same time he found that the Encyclopædia Britannica (Braunholtz 1929, p. 696) referred to the Siam-Cambodia region of Indo-China as one possible starting-point of Polynesian migrations: "In favour of the latter view is the fact that a people speaking an allied language (Mon-Khmer) and having physical affinities with the Polynesians is still living there."

In 1939, Williamson (p. 339) summarized the answers given by Polynesian ethnologists up to that time, pointing out that "the most which historical ethnology can do is to offer us a vast number of alternative possibilities, without any hope of ever knowing which is the correct interpretation; this is seen from the most cursory glance at the achievement of over forty years of historical speculation, which has resulted in nothing more than a number of utterly diverging theories of origin, and of alleged parallels with Polynesian culture in other ethnographic areas. . . . As we have seen, Handy assigns some traits of Polynesian culture to Southern India, others to China, and still more to 'intrusive' influences from Melanesia and America. Hedley puts up a plausible argument for an origin in Japan, while Stair cites evidence pointing to Korea, as well as to miscellaneous Indonesian islands. Shapiro prefers Micronesia, Dixon and Stokes argue for American connections,[1] while Hutton leads us back across the Pacific *via* Indonesia to Assam. It is of course possible to adopt the assumption of multiple provenances, the view that Polynesia has in the past been subjected to cultural bombardments from all the quarters suggested."

Since then, Shapiro (1943, p. 3) emphasized: "it is necessary to bear in mind that both the racial composition and the local differentiation of the Polynesians remain problems which have not yet received their final solution."

Later Buck (1945, p. 11), in his *Introduction to Polynesian Anthropology*, has suggested that: "They are a mixed people, but the predominant characters indicate a major Caucasoid origin. Some intermixture with Melanesians may have taken place in the Pacific, but the Mongoloid intermixture must have taken place in the Malay Archipelago or the adjoining mainland."

The last word on the subject has come from Oliver (1951, p. 51) in his monograph on *The Pacific Islands*. He shows that the real story of Polynesia has not yet been finally unfolded, since there is still no agreement as to the origin of the Polynesian islanders or the route and time of their migration. Polynesia must have been "the last great world area to be settled", and its people, when quite advanced in culture, must have come "from the direction of Asia." But he admits: "Beyond this point unanimity among the authorities disappears..." Oliver believes that one of the most widely accepted theories at present is the one which differentiates between two time-distinct "streams" of migrants from an unspecified locality somewhere in Asia. The theory is that "the second of these 'streams' did not leave Asia until fairly late and began entering the islands after the beginning of the Christian era." These unidentified migrants "found people much like themselves already living on many of the islands when they arrived." Oliver shows that even among proponents of this vague theory there has been much debate and no agreement as to whether the hypothetical Old World "streams" had found their way to distant Polynesia through Melanesia or through Micronesia, and although he does not support any alternative solution, he has nothing better to say of the cited theory than that it is "highly speculative."

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[1] As will be seen later, Dixon and Stokes did not suggest an American origin of the Polynesians, but argued that Polynesian islanders, sailing eastwards, had made casual visits to the coast of America.

In closing this brief survey of opinions about the Polynesian origins and migrations, we may return to Sullivan (1923, p. 211) who writes:

"Now if it is true that there is no Polynesian problem it should at least be admitted that there is need for someone to sit in judgement and to determine which of the various opinions reviewed above is in closest accord with the facts."

Working method and approach to the existing problems

Confronted with such a variety of opinions among those who have seriously dealt with the problem, we may at least safely deduce that the Polynesian islanders are not yet satisfactorily identified, their origin is not clearly known, nor the route, or routes, which their ancestors followed into the East Pacific. If only one of the solutions suggested above had been satisfactory, there would have been no need for the succeeding observers to go so far in search of other explanations, differing, often fundamentally, from those already presented.

A further study of the matter can therefore only count on progress if it begins right from the bottom, analysing existing material and accumulating all facts with a direct bearing on the question. These should be dealt with in such a manner as urged by Handy, who wrote the following wise comment in his paper on "The Problem of Polynesian Origins" (1930 c, p. 3; italics by T.H.):

"There is such a variety of possibilities open in the matter of relationships and derivations that my own feeling is that *there is only one sure way of being in the wrong, and that is by asserting dogmatically what is not true.* To be in the right, the only safe course appears to be to conceive and to study the problem in its largest dimensions, and having so grasped it, to resist all temptation to be dogmatic, to reject dogmatism in others, and to keep all doors and corridors open."

This is obviously the only sound approach to the problem, and in the following pages an attempt will be made not to reject any possibility in favour of any other, until it has been discussed and examined in the light of available evidence.

It is quite apparent that the existing divergency of opinion as to the classification of the Polynesian people, is caused by the fact that each observer has approached the problem within his own special field of study. A craniologist may be led in one direction, a mythologist in another. Theories of Polynesian fatherlands and migration routes have been founded upon a mere analysis of hair, others on skin colour, and many more on a metric study of average cranial indices. Other theories are based solely on myths, on a similarity in grammatical structures, or again on a pattern in decorative design, a tribal custom, or on the geographical distribution of a certain implement. None of these studies can be expected by itself to throw full light on the complex Polynesian history, however necessary in our days specialization may be.

In the primary task of accumulating fundamental knowledge it is, indeed, essential not to spread out too much, but to work deeply and concentratedly, whether in the field or in the laboratory, museum or library. But as the various investigations yield specific results, each within its own field, it becomes a subsequent and independent task to coordinate the available results, and to profit equally from all in an attempt at historical reconstruction.

There is need for many deep and narrow penetrations until independent fragments from the Polynesian past are brought together in sufficient numbers to permit an attempt at general reconstruction. It is not the task of the specialized student, when he comes to the surface with whatever he has discovered, to meditate in solitude on what his own fragment may have been a part of. Only when it is pieced together with those of other students can a clear idea be formed of the whole.

There is in our day a vast supply of information available in the various fields of Pacific research. Without access to this already existing material, to attempt to piece together a general picture of the Polynesian past would indeed be futile. In the following pages I have referred to observers from very different fields of science, using the essence of their findings as a foundation to an attempt at effecting a coherent reconstruction. In many cases, I have quoted the facts as stated by the author without commenting upon his own theoretical conclusions, provided these have been adequately dealt with elsewhere in the present work.

To a large extent, whenever an opportunity has been given, I have preferred to quote other writers rather than to use my own words, in fear of being guided by preconceived suppositions and associations which might not seem as natural to others as they do to me. All quotations are rendered in English.

In organizing the sequence in which to present the evidence, various attempts have shown me that a consistent or normal method of disposition and grouping of subject matter could not always be adherred to because of the width and multiformity of the material. Moreover, the inclusion of the Americas in the discussion of Pacific migration routes has unfortunately required, in a few places, a certain amount of repetition. Of such deficiencies I can only warn the reader and offer my apologies in advance.

My sincere thanks are due to all the writers quoted on the following pages, and to many others consulted in the course of the study, as well as to native informants and personal friends who have helped in the completion of the present work. I am particularly indebted to Prof. O. H. Selling, D. Sc. for his inexhaustive assistance and support. Valuable advise and encouragement in the course of my research have also derived from the late Prof. C. Bonnevie, D. Sc., Prof. H. Broch, D. Sc., Prof. G. Gjessing, Ph. D., Dr. H. Spinden, Prof. N. Nielsen, Ph. D., Mr. E. N. Ferdon Jr., M. A., and Dr. E. K. Reed. Last but not least a special acknowledgement to Messrs. Herman Watzinger, M. Sc., Knut Haugland,

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PART I

POLYNESIA AND THE OLD WORLD

POLYNESIA AND THE OLD WORLD

Upon the arrival in America of our own race, this hemisphere was already richly populated by an immense variety of tribes and nations. Some of them had developed cultures sufficiently advanced to be classed as civilizations. To the European explorers this amazing world was new.

The people receiving the European intruders were themselves descendants of immigrants from other parts of the world. Thousands of years earlier their own ancestors had crossed the Behring Strait from their old habitat in Asia, and found a world new to man. With full justification the American continents may thus be considered and denominated the "New World".

Oceania

With a foothold in the New World, a new coastline bordering on the Pacific Ocean was made available to our own race. This was all that was needed to open up the gateway to all the Pacific islands. The existence of thousands of oceanic islands, hitherto unknown to our own race in spite of generations and centuries of European navigation on the coasts of Asia, was suddenly revealed by explorers in sailing ships, who now, quite unhindered, pushed right into the ocean from the American side, with the trade wind right at their backs. A still newer world was discovered from America: The islands of Oceania.

To the surprise of the arriving Europeans, all these islands had already been discovered and settled by groups of unfamiliar neolithic people.

The true oceanic islands were later segregated ethnologically into three geographical sub-divisions represented by different varieties of man: Polynesia nearest to America, then Melanesia and finally Micronesia as we proceed further west towards the Old World. Even the early explorers soon realized the existence of different races in the newly discovered island world. The occupants of the Polynesian section were clearly distinguished from racial types further west by having a skin colour frequently only a tinge darker than that of the White discoverers, intelligent features appealing to the European mind and sometimes with a rather European aspect, and a good build with a markedly tall stature. Although widely scattered and isolated from each other over a vast water-space flanked by Hawaii, Easter Island and New Zealand, all the Polynesian tribes spoke dialects of the same language, a tongue peculiar to them and understood throughout the islands of the East Pacific, but nowhere else. Such a distribution of a single people, which had not even passed the stone age, is unique in the history of man. But isolated and preserved as they were on tiny ocean islands, remote from the disturbing impulses of foreign trade and aggression that affect most continental nations, the Polynesians should at least be expected to have retained much of their original purity, and to present a minimum of racial and cultural intermingling with surrounding peoples.

In other words, the tribes isolated in Polynesia would seem to offer ideal conditions and an intriguing problem for the student of the Pacific past. Although there is apparently an endless choice of possibilities, these may be drastically reduced if we systematically couple one field of science with another. What is possible to the craniologist may be unfeasible to the sociologist, and vice versa. To simplify matters, we shall here start, from the very bottom, with such a system of elimination.

Alternatives and reductions

The zoologist can tell us that the Polynesians are immigrants and not autochtonous to the Pacific Islands. Where not even the lowest species of warmblooded animals are truly native of the land — except the birds and bats of the air — the primeval home of mankind cannot be located.

It is equally clear that no former land-bridges could have connected present Polynesia with any of the surrounding continents, at least not in human times. Land-bridges available to man would have been equally open for the use of contemporary terrestrian animals, and the exceedingly primitive Polynesian fauna would have had an entirely different structure. As it is, the reptiles are represented by a couple of small lizards, even amphibious animals are totally absent from the whole of Polynesia, and indeed not a single terrestrian mammal has been found on any of the islands, New Zealand included. The pig, dog and rat, existing on various islands at the time of European arrival, had entered Polynesia as passengers on man-made craft.

The unexpected discovery of such outstanding monuments of past civilization as the stone colossi on Easter Island has encouraged speculative theories of geological disturbances, and popular writers have even suggested sunken land-masses in the East Pacific, of which only the highest peaks have remained above the surface to form the present islands. Such ancient submergences may be considered in the immediate vicinity of Malaysia and Australia, and even Melanesia, but geologists maintain there is no chance of their having contributed to the present pattern of the true oceanic islands. Again, a study of the island fauna and flora may testify to the remote antiquity of the present island pattern in Polynesia. A good example is seen in the distribution of the immense variety of local land-shells, which in itself is sufficient to show that not only have the various island groups been separated from one another by sea for an immense period of time, but this has also been the case with the individual islands within a single group.

The coral polyps, which can only live and grow at a given depth below the surface, have also had ample time to form barriers of great age round the coasts of the volcanic islands, not to mention the numerous islands built up entirely by these tiny organisms.

The recent borings of the Swedish Deep Sea Expedition, which have made it possible to perform laboratory analysis of cores, 2.5 m. to 15 m. long, of bottom sediments from right across the equatorial East Pacific, from the American coast to Polynesia, have settled this question once and for all by verifying that the general distribution of land and sea in this area has been unaltered for at least the last million years. (See Petterson 1950; and Part VIII below.)

We thus have sufficient evidence to deduce that the Polynesian ancestors must have arrived in their present domain by sea, finding the islands with the same general geographical features as today. It is only natural then to examine the territories surrounding Polynesia for traces of the voyagers who entered Polynesia by boat.

The Polynesian territory is surrounded by Australia (with Tasmania); New Guinea and Melanesia; Micronesia; and behind these Asia, with the Malay or Indonesian archipelago and Japan; the Americas with the Northwest Coast archipelago; and the Antarctic. With the exception of the uninhabited Antarctic, all these continents, and even the continental islands, are known to have been settled by man long before the admittedly recent era when the first voyagers entered their deep-sea craft bound for Polynesia.

The Austro-Melanesian territory

The various Melanesian tribes, and the aboriginal inhabitants of Australia, Tasmania, and New Guinea, with their dark, often black skin, frizzy hair, and negroid appearance, are today recognized by anthropologists as belonging to quite different branches of mankind, although certain Melanesian elements have sporadically entered certain Polynesian families through marginal contact, particularly in the vicinity of Fiji. The negroid peoples have been shown to be of great antiquity in their present domain. And, at the early period when they spread from the continent, somewhere beyond the present Indonesia, their close-packed continental islands may, to judge from geological data supported by zoology, have been partly joined to larger land-masses, thus permitting almost unimpeded migrations by land, with only narrow channels to cross. Their marked racial divergence from the light-coloured Polynesians puts them out of court as a possible source of that race; and they have occupied their own Austro-Melanesian territory from such an early period that the Polynesians cannot have dwelt there before them. These facts are generally accepted by anthropologists of our day. (For the racial elements of Melanesia, see e. g. Howells 1943.)

The Micronesian territory

North of the Austro-Melanesian block of alien aborigines, Polynesia is equally well sealed off from the waters of Asia by a four thousand miles wide ocean entirely occupied by Micronesian peoples. Micronesia forms, together with Polynesia, the only truly oceanic island territory of the Pacific.

We may divide the possibility of a Polynesian arrival from Micronesia into two alternatives. Either the Polynesian people originated among the Micronesian isles and atolls, or they once passed through this vast territory, using the many farflung islands as steppingstones on a migration from the Old World to Polynesia.

The first alternative may again be divided up into two possibilities, (a) that the Polynesians were descendants of Micronesian people, or (b) that they had an independent geographical origin within the islands which are at present occupied by Micronesians.

Upon the discovery of the various Pacific groups, a sharp demarcation-line was quickly drawn between Micronesia and Polynesia owing to the evident difference in race and culture between the two peoples inhabiting these respective parts of the Pacific. Modern research has supported this distinction, showing that physically the Micronesian islanders differ from their taller, lighter-skinned neighbours to the east, even in the matter of blood groups (Shapiro 1949, p. 25).

Although basically, like the Polynesians, of unknown origin, the Micronesian tribes display a great mixture of race, into which elements from neighbouring peoples have entered, the Melanesian characteristic being also represented. Indonesian elements are clearly noticeable in the Palau Group and on some other neighbouring islands to the extreme west, but no further. Quite similarly, at the other extremity, four thousand miles away, Polynesian elements, coming in from the opposite direction, are noticeable in the Gilberts and certain other islands to the east.

Murdock (1949) has shown that Polynesian culture did not develop out of Micronesian, but that, on the contrary, Polynesian elements coming in from the east have affected certain atolls secondarily. Micronesia, he said (*Ibid.*, p. 9),"forms a single distinctive culture area, and within it, 15 sub-areas can be distinguished. One (the atolls of Nukuro and Kapingamarangi) is Polynesian in culture. The other 14 reveal, by contrast, a fundamental unity in culture and social structure. ... Melanesian and perhaps Polynesian influences have penetrated Ponape and Kusaie."

As will be shown later (p. 68) the two "Polynesian" atolls in Micronesia — Nukuro and Kapingamarangi — appear to have been settled by late Polynesian voyagers from Samoa and Tonga.

As the Polynesians are not descendants of their present Micronesian neighbours we may see whether, at an earlier era, they may have dwelt independently within the Micronesian domain.

We find, at the first glance, that slender resources face the islanders of this archipelago. The great majority of the Micronesian isles are tiny low atolls rising only a few feet out of the sea, with practically no soil to cover the barren coral. The inhospitable sand will support few useful plants. (Krieger 1943.) As in Polynesia, the vertebrate fauna of these islands is restricted to birds and bats and a couple of species of lizard. Neither the Polynesians therefore, nor any other men, can have originated on the Micronesian atolls, and, as the Polynesians cannot have descended from the Micronesian people, they must either have come from a different direction, or they may merely have passed through Micronesia using these islands as oceanic stepping-stones and resting-places, for shorter or longer periods, on a migration from Asia. If the latter be the case, it will be necessary to transfer our attention still further west, to the aboriginal population of the Old World, thousands of miles behind the racial barrier of the Austro-Melanesian continental block and the farflung atolls of Micronesia.

We are now moving out of the actual oceanic territory.

The Indo-American or Yellow-brown race

Left for consideration is Asia, with Indonesia, and the Americas. And actually, throughout this circum-Pacific border territory, from Indonesia in the south to Siberia in the north, as well as all through the Americas, one can find — sporadically and in broad features — members of the particular branch of humanity to which the Polynesian subdivision belongs. (Hrdlička 1912 b, 1916, 1923; Boas 1925, 1929, 1933.) Referred to as the Indo-American race (Bryn 1925, p. 80), or, more frequently, as the Yellow-brown race, this early branch of mankind is known to have had its origin somewhere in Eastern Asia. From this common source, groups of the race spread southwards into the present Malay or Indonesian Archipelago, and also northwards by way of northeastern Siberia and northwestern America into the New World.

Boas (1933, p. 358) states: "The American race appears most closely affiliated with the large group that includes the people of the Malay Archipelago, and the whole of eastern and central Asia..."

Hrdlička (1912, p. 183) includes the Polynesian tribes in the same great stream of humanity, pointing to the resemblances in physical structure of two of its branches, the Polynesian islanders and various aborigines of the Americas.

The Yellow-brown man was probably neither the first nor the last type of mankind to filter through the northern passage from Asia into the New World. It is generally believed that the narrow passage of the Behring Straits, and perhaps the close string of Aleutian islands, maybe even the northern Kuroshiwo Current, have permitted small successive bands of immigrants to enter America from the Old World, representing samples of the various strata of humanity that have followed each other throughout time in Estern Asia.

Thus, it has been argued (Bryn 1925; etc.) that, although strongly represented both in America and in Eastern Asia, nowhere else in these continetal territories do we find the norm of Yellow-brown man as purely represented as among certain isolated jungle tribes of South America and some of the islands tribes in Indonesia. Many strong racial—and perhaps some cultural—parallels that have been noted between Malay tribes and South American jungle dwellers, may be due to this landward descent from a common Asiatic parantage, leaving no need for speculations as to jungle tribes having received or transmitted impulses by deep-sea craft 10 000 miles or more across the South Pacific.

The main racial characteristics of the Yellow-brown type of man, as revealed for example among the Malay tribes, are as follows: yellowish-brown skin colour; short stature; black, straight, coarse hair; absence of beard and body hair; flat, broad and pulpy nose; round head. These were the physical traits of the true Malays. Obviously, if such Malays had been able to send a sample of their own kin by boat into the extreme East Pacific, this subsequently isolated branch also would possess and preserve these same characteristic features of the Yellow-brown race.

Let us therefore first consider the possibility so widely and readily accepted by people who are not students of Polynesia, that the Polynesians are merely oceanic descendants of the Malays. The alternative possibility of mixed origin including Malay blood will be dealt with later; but we shall at present consider whether an early eastward expansion of the true Malay stock is admissible as an explanation of Polynesian origins.

The Malays, and the fair skin in Polynesia

The typical yellow-brown skin-colour of the Malays, that has given its name to a large race living round the Pacific is, we find, far from being uniform among the Polynesians of the East Pacific. Among them, as opposed to the true Malays, there are individuals representing all shades of skin colour, "some so fair that blushes in their cheeks can be seen, while others are so dark that tattoo marks can scarcely be detected." (Thomson 1871, p. 30.)

The dark tinge may well be an element due to some Melanesian infiltration, we shall therefore first concentrate on the exceptionally *fair* complexion found in Polynesia, as this is a dominant feature, and so common that Haddon (1924, p. 6) lists the Polynesians under Leucodermi, as a white-skinned people, like the Europeans.

To make quite sure that the light complexion in Polynesia was not due to intermixture with Europeans, we shall note what some of the early discoverers wrote on coming into contact with the aboriginal Polynesians when these were still in their pure state.

In 1595 the first land was discovered in Polynesia by the Mendaña expedition, which reached the Marquesas Islands in two Spanish caravels from Callao in Peru. In the early narrative of this expedition, Quiros (1609 b) describes how the very first Polynesians ever to contact a European ship came paddling out from the coast of Fatuhiva (Magdalena Island) in a great number of canoes, others swimming beside. We learn (*Ibid.*, p. 16) that the explorers were thus received by "altogether, four hundred natives, almost white, and of very graceful shape. ... Many of them were ruddy." Of a certain native boy about ten years of age we read (*Ibid.*, p. 17): "...his countenance was like that of an angel ... of a good colour, not fair but white; his locks like that of a lady who values them much." And the women (*Ibid.*, p. 27): "Respecting their complexion, if it cannot be called white, it is nearly white."

More isolated than any other inhabitable island in the world, and yet discovered and settled by aboriginal Polynesian people, Easter Island was first visited by Europeans when sighted by a Dutch expedition under Jacob Roggeween, arriving by way of South America on Easter day, 1722. There seemed to be no uniform skin-colour among the local inhabitants who received the Europeans, according to the following account left us by the Dutch visitors (Behrens 1737, p. 136): "As for their complexion they are brownish, about the hue of a Spaniard, yet one finds some among them of a darker shade and others quite white, and no less also a few of a reddish tint as if somewhat severely tanned by the sun." When some of these newly discovered Easter Islanders came aborad Roggeween's ship, we are informed that (p. 134): "One amongst these was an entirely white man, ..."

After Roggeween's brief call Easter Island was not visited by Europeans until the Viceroy of Peru in 1770 sent out Don Felipe Gonzales with the Spanish frigate *Santa Rosalia*. Two of the officers on board commented on the appearance of the local natives; one (Hervé 1770, p. 127), briefly mentioning their light skin, added that "if they wore clothing like ourselves they might well pass for Europeans." The other (Agüera 1770, p. 96) pointed to the same European physiognomy among the Easter Islanders, and entered in the ships journal: "...these islanders being in colour between white, swarthy, and reddish, not thick lipped nor flat nosed, the hair chestnut coloured and limp, some have it black, and others tending to red or a cinnamon tint. They are tall, well built and proportioned in all their limbs; "Finally, in a letter to Hawkesworth, written immediately upon the return of this Easter Island expedition in 1770, we find the following first hand information (Corney 1903, xlv): "Its natives number about 3 000 of both sexes. ... The men are thickly bearded, tall, well set up, white and ruddy."

Later, when Beechey visited Easter Island, he simply stated (1831, p. 38): "The colour of their skin is lighter than that of the Malays."

Beechey was the first European explorer to visit the Polynesian inhabitants on lonely Mangareva, or the Gambier Islands, to the west of Easter Island. He wrote about the natives he found (*Ibid.*, p. 136): "There is a great mixture of feature and colour among them; ...It seems as if several tribes from remote parts of the Pacific had here met and mingled their peculiarities." The natives came paddling out to his ship on a flotilla of log-rafts, and one raft brought a very fair person of "superior appearance" who wore moustaches and a light turban, "which gave him all together the appearance of a descendant of Ishmael." (*Ibid.*, p. 109.)

The same explorer (*Ibid.*, p. 147), visiting the natives of the Tuamotu Group, likewise at the eastern extremity of Polynesia, found that "here also there was among them a great diversity of complexion." He speaks, on various occasions, of natives with light skin and European features, and from Lagoon Island, at the far eastern end, he wrote: "One man, in particular, and the only one who had whiskers, was so fair, and so like an European, that the boat's crew claimed him as a countryman."

When Wallis discovered Tahiti in 1767, Robertson (1766–68, pp. 148, 179, 215, 228) recorded in his log that the greatest surprise was caused by the marked difference in hue to be observed among the natives. They found some to be "a light coper collour others a mullato and some almost if not altogeather White—. . ." Light skin was especially noticeable on the women: "One in particular was fully as fair and hade as Good features as the Generality of Women in England, hade she been drest after the English manner, am certain no man would thought her of Another Country; ...we compaird skinns and hers was rather fairer and Whiter nor mine,..."

Captain Cook (1768–71, p. 91) also wrote from Tahiti, in the journal of his first voyage in 1769, that the natives on this island varied greatly in complexion. The upper class of people, he said, were not at all as dark as what he terms the inferior sort, ..."nay, some of the Women are almost as fair as Europeans."

Cook has the same to say from the Marquesas Group, where the women and the youths, who were little tattooed or not at all, "are as fair as some Europeans". Among the Polynesian Maori in New Zealand he also found natives resembling Europeans. When he discovered Mangaia, one of the natives who came on board his ship was "of the same cast with that common to the most southern Europeans". In Tonga, or the Friendly Islands, he found a great variety in the population, with "hundreds of truly European faces". Finally, en route to Northwest America, Cook discovered the Hawaiian Group, or the Sandwich Islands, in 1778, and here too he met with a varying population, including natives with "visages not being very unlike those of Europeans."[1]

Forster, who accompanied Cook on his second voyage round the world, also stressed the European colour and aspect observed among the Polynesian population. He wrote of the natives of Tahiti (1778, p. 234): "...on the cheek of the fairest of their women, you may easily distinguish a spreading blush." Speaking of the "better sort" of inhabitants at Tahiti, he pronounces their skin to be "of a lighter tint than the fairest complexion of an inhabitant of the East-Indian islands;..."

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[1] Capt. Cook 1777, Vol. I, p. 308; 1784, Vol. I, pp. 154, 172, 380, Vol. II, p. 192.

East Indian or Malay islanders, moving east from their own domain, would have to pass through the habitat of black-skinned Austro-Melanesians, and they could thus hardly show a *fairer* complexion when emerging at the other end to settle Polynesia.

The tall Polynesian stature

The Malays, like all the true Indonesians, are small people of short stature, like most Yellow-brown people. As already stated, the Polynesians are tall; they even rank among the tallest people in the world, with an average stature of about 171.4 cm. (Easter Island, 173.32; Tonga, 173.0; Samoa, 171.7; Society, 171.02; New Zealand, 170.6; Marquesas, 170.44; Hawaii, 169.51. See Shapiro 1940 b, p. 28.)

The Polynesian race is tall wherever we meet with it, whether on the islands at the Equator or in the cool latitudes of New Zealand. Commenting upon this, Shapiro, in his study of *The Physical Characters of the Society Islanders*, writes (1930, p. 279): "The Polynesian island groups show an amazing lack of mean variation in stature. Considering the geographical diversity between New Zealand and the Society Islands, the isolation of the various groups, it would not have been surprising to find considerable differences from island to island."

This may be taken as a good indication that the Polynesians were already of tall stature before they spread themselves over the East Pacific island world. That the tallness, like the fair skin, existed before European intermixture, may be seen from a few statements by the early explorers.

When the Mendaña expedition discovered the Marquesas, and the four hundred natives came out to their ships, we read (Quiros 1609 b, p. 16): "On this about forty came on board, beside whom the Spaniards seemed of small stature."

Agüera wrote from Easter Island in 1770 (p. 99): "The men are generally of large stature, very many exceeding 8½ span [5 ft. 11 in.]; most of them attain 8 spans [5 ft. 6½ in.] and there were two whom out of curiosity we measured, one of 9 spans and 2 inches [6 ft. 5 in.] and the other 9 and 3½ inches [6 ft. 6½ in.], all of their limbs being of proportionate dimensions."

Beechey (1831, p. 137) found the average height of the first Mangareva islanders to be seen by our race to be the same as that of Englishmen, but they were not so robust. One man who came onboard measured 6 ft. ½ inch and one seen ashore 6 ft. 2½ inches.

Cook (1777, Vol I, p. 308) recorded that in the Marquesas the men were "in general, tall; that is, about five feet ten inches or six feet;" while his companion Forster (1778, p. 230) saw in Tahiti several over 6 ft. 3 inches and one of 6 ft. 4 inches.[1]

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[1] Ellis (1829, Vol. I, p. 82) maintains that unusually tall stature frequently occurred among chiefs and persons of hereditary rank in most Polynesian groups, "although they are not elected to their station on account of their personal endowments, but derive their rank and elevation from their ancestry". Thus he says from Tahiti: "The

We need no further proof to know that the isolated tribes in the far East Pacific present a contrast to the inhabitants of Indonesia in regard to stature and build.

No uniformity of black, straight hair in Polynesia

The structure and colour of hair has to many physical anthropologists been a favoured criterion of race. Some have gone as far as to lay down that the cross-section of a hair under a microscope is sufficient to settle the race of any one individual; while F. M. Brown (1942, p. 250) holds that we should be satisfied if the various races and sub-races can be generally distinguished by such a method.

We shall, at least, be on the safe side if we say only that the hair of Europeans tends to be more or less soft and wavy with varying colours; whereas the Black race generally has coarser, black hair, curly or frizzy in texture; and the Yellow-brown race has very straight, stiff, coarse hair, black — almost bluish-black — in colour.

In this respect also the Malays follow the norm of the yellow-brown race. The Polynesians, however, do not. After a careful analysis Sullivan (1921, p. 97) described the hair of Samoans as "European" in texture, "European" in form, and "Mongoloid-European" in colour. Including the Tongans later in his somatological study of the Polynesians, he wrote (1922, p. 258):

"They do depart somewhat from the bulk of the Yellow-brown peoples in hair form. Coarse, stiff, or lank black hair occurs only rarely in these two groups. The prevailing form is moderately coarse in texture and either straight or, quite as often, slightly wavy in form. This more than any other one thing is responsible for the theory of a European origin of these peoples. Now while the hair is not so stiff, straight, and coarse as the prevailing form of hair in the Yellow-brown peoples, neither is it so fine as the prevailing hair form of the Caucasians. I do not wish, however, to make too much of this point and am willing to grant that in this one character the Samoans and Tongans approach nearer to the Caucasian than to the Yellow-brown types. The same can be said of the lack of prognatism and of the development of the chin."

Still later, when his research had been carried east as far as to the Marquesas Group, Sullivan (1923, p. 225) stated: "While the hair form is still somewhat doubtful, it is certain that there is little or none of the stiff, coarse hair of the Mongol in Polynesia. In almost every individual there is also a suggestion of brown in the hair pigment in certain lights."

As the sporadic existence of reddish or auburn hair in all parts of Polynesia will later be dealt with fully, it is sufficient here to note that this feature too was recorded by the early travellers as existing so strangely among the otherwise black-haired aboriginals of Polynesia. Thus, at the early discovery of the Marquesas, the Mendaña expedition (Quiros 1609 a, p. 150) found "natives, white, and of very agreeable appearance, tall and strong... and most beautiful flowing hair, and many of them very fair. ...Let this not be taken for

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father of the late king was six feet four inches high; Pomare was six feet two. The present king of Raiatea is equally tall. Mahine, the king of Huahine, but for the effects of age, would appear little inferior, ...Some individuals among the lower classes exhibit a stature equal to that of the chiefs; but this is of rare occurrence..." Banks also (1896, p. 128) referred to the tallness of Polynesian men, and measured one who was 6 feet 3½ inches tall.

exaggeration, for so it is." They even speak of a certain red-haired Marquesan woman whose locks were so beautiful that they wanted to cut off a sample. (Quiros 1609 b, p. 22.)

Cook (1777, Vol. I, p. 308) later supported these statements by saying that the hair of the Marquesans, "like ours, is of many colours".

From Hawaii, Easter Island, the Tuamotus, the Society Islands, Tonga, and Samoa we shall later present similar data as to deviating forms of hair, we shall here only include Colenso's reference to the Polynesian Maori of New Zealand (1875, p. 341): "As their complexions varied, so did their hair. Generally it was profuse, black, and waving, or slightly inclined to curl. Sometimes it was red, of which colour there were also many shades;"

Whatever may be the origin of this Caucasian element in the hair of Polynesians, it certainly owes nothing to a Malay inheritance.

The growth of beard in Polynesia

The Yellow-brown peoples are well known as possessing another characteristic which distinguishes them markedly from our own race, namely, the absence of beard and body hair. The bearded faces of the early European discoverers made a great impression on all the people of territories previously inhabited only by genuine and beardless Yellow-brown men. The Malays follow their own race in this physical peculiarity.

Sullivan (1923, p. 225) came to the following conclusion after his somatological research in Polynesia: "While the hair is not so well developed on the face and body of the Polynesian as it is on most Caucasians, it is still considerably nearer the Caucasoid norm than it is to the Mongol norm."

This trait, too, was present in many parts of Polynesia before the advent of the Europeans. When the Mendaña expedition first came into contact with the Marquesans, they saw an old man "with a long and well-ordered beard, who ... put both hands into his beard, raised his moustaches, stood up, and cried out, looking in many directions". (Quiros 1609 b, p. 18).

Both Cook (1777, Vol I, p. 308) and Forster (1778, p. 232) speak of the Marquesans as bearded. The former says: "They observe different modes in trimming the beard, which is, in general, long. Some part it, and tie it in two bunches under the chin; others plait it; some wear it loose; and others quite short." Cook also writes of long beards among the natives of Tahiti, Hawaii, New Zealand and other Polynesian islands, some of which were first discovered by him.[1] Forster (1777, Vol I, p. 560) recorded that the first native to board his ship at Easter Island "was remarkably hairy on the breast and all over the body.... his beard strong, but clipped short,..."

Beechey (1831, pp. 38, 104, 138) wrote from the same island: "The beards of such as had any were black; but many had none, or only a few hairs on the chin." At Crescent Island he found the natives tall and well-made, with thick black hair and beards. With the natives of Mangareva "the mustachious grow long, but the beards, which are kept from three to four inches in length, are sometimes brought to a point, at others divided into two; one man, however, was observed with a beard which hung down to the pit of the stomach..."

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[1] Cook 1784, Vol. II, pp. 147, 192; Vol. I, pp. 155, 172.

Lamont, one of the first Europeans to reside on Tongareva, or Penrhyn Islands, speaks of the islanders as having "handsome bushy beards, generally black, but sometimes tinged with auburn, . . ." (Smith 1890, p. 92.)

It is interesting to note with Handy (1930 c, p. 8) how Sullivan's analysis of comparable physical series in Samoa and the Marquesas showed the local existence of beard and body hair to be strongly associated with light skin and tall stature.

Beards are also occasionally seen on the strongly Polynesian-affected Gilbert Islands next to Polynesia (Krieger 1943, p. 27), whereas the Micronesians otherwise generally pluck out what sparse facial hair they may grow, as do certain Amerinds and other generally beardless Yellow-brown people.

The beardless Malays cannot be made responsible for the unexpected distribution of what is occasionally a heavy growth of beard in Polynesia.

The occurrence of aquiline nose in Polynesia

There is another noteworthy feature among the Polynesians in the far Eastern Pacific, which cannot with any degree of likelihood have been brought there by the Malays or their Indonesian neighbours. This is the "not uncommon aquiline contour of the nose" (Lydekker 1906, p. 2). The soft, low-ridged and flattened nose of the Malays, an inheritance from the original Yellow-brown type of man, is not at all characteristic of the Polynesian people.

Sullivan (1923, p. 216), after a systematic anthropometric analysis of nasal height and width in Polynesia, came to the conclusion that "the nasal height of the Polynesians exceeds that of nearly all other peoples except a few American Indian tribes, the Aino, the Tyrolese, Samaritans, and the Ilocano."

The same author stressed: "It is important to note that only some American Indians and the Aino approach the Polynesian nose in both diameters, and these for the most part are deficient in width."

In another passage (*Ibid.*, p. 227) he says: "The highly arched, long, narrow nose is usually looked upon as one of the most distinctive characters of the Caucasian types. Although the Polynesian nose is much more massive, yet it approaches to some degree the Caucasian type of nose. But it should be remembered that many American Indian groups have approached the Caucasian norm more closely."

Sullivan's study produces (*Ibid.*, p. 232) this conclusion: in nose form "the Indonesian is the antithesis of the Polynesian".

In the accounts of some of the early voyagers too, we find references to the aquiline shape of the nose in early Polynesia. Beechey (1831, p. 38) wrote of the Easter Islanders: "The lips, when closed, form nearly a line, showing very little of the fleshy part, and giving a character of resolution to the countenance. The nose is aquiline and well-proportioned;"

Also of the inhabitants of Mangareva he stated (p. 138): "...the nose in general is aquiline; "

Cook (1784, Vol. I, p. 380) noticed "a fullness at the point of the nose," which was very common among the islanders in the Tonga Group, adding that he also saw "many genuine Roman noses, amongst them."

The hooked nose was perhaps more prominent among the Morioris of the Chatham Islands than elsewhere in Polynesia. Baucke (1928, p. 17), himself born on this group in 1848, described one branch of the local aborigins as having a "predominating narrow Aztec face" and "pinched high-ridged down-curved nose". Tregear (1889, p. 75) writes from the Chatham Islands that "the hooked nose sometimes seen on the Maori face, especially in the north, is here very common, and in some cases, exaggerated to portentous dimensions."

It is sufficiently obvious that a theory of Malay movement will not account for the occurrence in various parts of Polynesia of this hooked or aquiline shape of the nose.

The inconstancy of the Polynesian cephalic index

A study of cranial shapes in Polynesia has given rise to many and most divergent hypotheses of Polynesian origins, although the promoters of the Malay theory have received little or no comfort from this quarter. As with the microscopic analysis of hair, so with the metric study of human crania, both may be of great value in a broad and general treatment of human types and relationships, but there may be a limit to their dependability if used alone.

Boas (1912, p. 262), after his anthropometric study of U.S. immigrants and their descendants, disputed the stability of human cranial shapes, and maintained that "headforms may undergo changes in course of time, without change of descent." Although this view was later opposed by Pearson and Tippett (1924) in their paper "On Stability of the Cephalic Indices within the Race", even these writers admitted: "A considerable number of anthropologists seem to believe that all racial problems can be solved by merely ascertaining the mean cephalic index within a given group or district. As a matter of fact, such a belief can lead only to a deceptive simplicity of treatment; no group can be defined without the study of a multiplicity of characters."

It is quite apparent and generally agreed that the Malay people are round-headed or brachyocephalic, as their cephalic index $\left(\frac{\text{head width x 100}}{\text{head length}}\right)$ is well above 80. But in Polynesia matters are far more complicated.

In his resumé of the craniological investigations of Easter Island racial affinities, Shapiro (1940 b, p. 27) fails to discover any unanimity of opinion. All he can do is to affirm that the Easter Islanders are Polynesians and not Melanesians. The latter theory has often been propounded by craniologists who have observed that the Easter Islanders are dolicocephalic or long-headed, as are the Melanesians, in contradistinction to the brachyocephalic or short-headed Malays. Shapiro furthermore stresses that "cranial information on Polynesians is entirely inadequate and often misleading. In fact, I believe that part of the confusion which has arisen from the craniological studies of the Easter Islanders may be attributed to inadequate information on the cranial characteristics of Polynesians."

It is interesting to note that Shapiro (1940 b) places the Easter Islanders in the dolicocephalic group (c.i. 74.61); that Buck (1922) places the New Zealand Maori in the mesaticephalic group (c.i. 77.7); and Sullivan (1922) places the Tongans in the brachyocephalic group (c.i. 81.1). This alone is sufficient to show the danger of depending too strictly on cranial forms in judgement of race, as the three examples mentioned all refer to members of the same Polynesian people. The reason for the divergence of opinion in the classification of Polynesian crania is obviously that the *mean* headform among these particular islanders is an abstract and imaginary concept. It is practical to speak of the mean headform or mean cephalic index of a distinct and homogeneous tribe, but if a people should happen to be composite, the average index will vary with the numeral strength of the respective component elements selected for the statistical measurements.

One example will suffice to illustrate this point: The islanders of the Marquesas Group are referred to in the technical literature as having a cephalic index of 78.89. Thus their headform appears to be medium, and to fall into the meso- or mesati-cephalic group (c.i. between 75 and 80), and as such they are generally treated in comparative anthropological studies. In reality, however, the truth is this (Sullivan 1923, p. 177): "The cephalic index of Marquesans ranges from 72 to 91. This range of 20 points is rather high, but most of the individuals fall between 76 and 82 in the male series and between 77 and 84 in the female series."

There are accordingly both long-headed, medium-headed and short-headed individuals in the Marquesas Islands; and although they vary over a range of 20 points—from dolicocephaly to brachyocephaly—yet the average naturally becomes medium, and may be fixed at a theoretically exact figure of 78.89.

We shall therefore, in the present study, be very careful in our treatment of mean cephalic indexes among the unidentified Polynesians, and merely state that no *pure* descent from the brachyocephalic Malays will account for the complexity of cranial forms in the Polynesian islands. For there are dolicocephalic elements in Polynesia which contrast with known facts concerning the Malay people, and which have nothing to do with Melanesian influence.

The absence of the B factor among full-blooded Polynesians

At the end of the last century a great evolution in serological techniques commenced, which should become of great use to later anthropologists. It was discovered that differences existed in the blood of different species of animals, and at the turn of the century Landsteiner made his discovery of three different groups of human blood, a number which was shortly after increased to four, O, A, B, and AB.

At the end of the first World War, L. and H. Hirszfeld, having already found that the blood group factors were hereditary, began to inquire into the racial distribution of blood groups. The first important discovery that was made has a direct bearing upon the present work. It was found that the A factor was highest in the peoples of western Europe, and that it decreased from west to east as the B factor gradually rose to become dominant among the peoples of Asia.

Later studies by Boyd (1939 a) and many others have revealed that group B reaches its world maximum in India, being high throughout Eastern Asia, including Indonesia, and even right into Melanesia and Micronesia. A clear break is marked at the border of Polynesia, where the B factor drops to a minimum, or is absent. (Nigg 1930; Phillips 1931; Shapiro 1940 a.)

Only on the extreme western margin of Polynesia, bordering directly on Melanesia and

Micronesia, both high in B, is there any impressive incidence of B. Further away, as in the Tuamotus and Easter Island, the B factor is conspicuous by its total absence. (Shapiro 1940 a, p. 411.)

A closer examination of the blood groups will be made later (Part II). At present it is sufficient to stress that this racial factor, considered to be one of the most dependable factors in a study of inheritance, speaks strongly against a Polynesian descent from Malays, or from any other Indonesian stock. It would be forcing a favourite doctrine against better evidence to ignore the strongly marked serological demarcation line which severs the Polynesians east of Samoa from the Melanesians, Micronesians, and Indonesians to the west of this line. The quite extraordinarily low percentage of blood group B in Polynesia, indicating an original purity of only O and A in this domain (Phillips 1931, p. 287; Shapiro 1940 a, p. 416), obtains no satisfactory explanation from a theory of Malay or Indonesian descent.

The inconsistency of the Malayo-Polynesian theory

As has already been stated, the theories of Polynesian descent from the Malays were originally based on much debated linguistic observations, and have never quite convinced physical anthropologists. Long before the discovery of blood groups, anthropologists like Wallace (1883, p. 498) had said of the Polynesians: "We have already seen that their tall stature, their curly hair, their well-formed and rather prominent features, their joyous and laughter-loving dispositions, all separate these people widely from the true Malays."

At the turn of the century, Deniker (1900) wrote in his *Races of Man:* "It has been said and frequently repeated, though without precise documents to warrant the assertion, that the Indonesians resemble the Polynesians... but recent anthropological research has proved that this is not the case. The Indonesians have none of the special characters of the Polynesians. ...the form of the nose, of the lips, of the face, as well as various other traits present notable differences."

After a more methodic analysis of the anthropometric data in Polynesia, Sullivan (1923, p. 232) was in a position to state with certainty that the Indonesian and Polynesian have little in common apart from, probably, a very remote ancestral descent from the same Yellow-brown race. He wrote: "This somewhat doubtful and certainly distant relationship is indicated by their great divergence in nearly every trait studied. The Indonesian is the antithesis of the Polynesian in face form, head form, and nose form. It is also separated in degree of pigmentation, thickness of the lips, beard and body hair development, and eye form."

We shall not leave Indonesia at this. As already stated, the basis for all theories of Malay movements into Polynesia is the unidentified origin of the Polynesian islanders coupled with the discovery in the eighteenth century of certain linguistic affinities between the Polynesians and the Malays.

How apparent are these linguistic affinities, and how much can be deduced from them?

The debated existence of a linguistic clue

As soon as the similarity between certain Malay and Polynesian words had initiated a systematic inquiry by philologists in the middle of last century, a regular chaos of Polynesian theories immediately arose. The suspected linguistic kinship proved to be so hazy and fluctuating that it was useless as an indicator of Polynesian movements. Some distant connection was apparent, but it was altogether too sporadic and vague to indicate anything beyond some very ancient contact between the primeval ancestors of the two peoples.

After the theory of a direct Malayo-Polynesian relationship in language had been propounded by Marsden in 1834, the question was in the following decades considered by Humboldt, Buschmann, Crawfurd, Latham, Ranke, Keane, Fraser, Dieffenbach, Bopp, Fornander, Churchill, Tregear, and other writers.

Of the first pioneers, Humboldt revealed the presence in Malay, but the absence in Polynesian, of a large class of ancient Sanskrit terms; Buschmann pointed out various common features; Crawfurd denied the existence of any linguistic relationship; Latham included even the languages of the negroid Melanesians in the same comparison; and Hale simply ignored the theory of linguistic relationship.

Later Ranke (quoted by Wallace 1883, p. 261), concluded that the Polynesian language was "totally distinct from the Malay, has a different construction, has very few Malay roots..." and Dieffenbach (quoted by Fornander, 1878) found that: "The Polynesian language is, in its whole formation and construction, by far more primitive than the Malayan and the rest of the Javano-Tagalo languages."

Fornander (1878) held that the most which could be said about a Malayo-Polynesian kinship of speech was that the Polynesian language was "an older surviving form of a once common tongue". He indicated the vagueness in this relationship by quoting Keane, who came to the conclusion that "the absence of Malay words in the Polynesian is a proof that the latter had left the Indian Archipelago before the former had invaded it..."

Evidence did not seem to speak much in favour of a Polynesian descent from the Malays, when even prominent linguists felt impelled to suggest that the Polynesians must have left Indonesia before the Malays had even appeared in those quarters.

Alexander (1878) pointed to further indications of the same sort: Humboldt had forty years before noted a large class of Sanskrit words which had entered Malay proper, Javanese, and Bughis at a very ancient period while still live and genuine in form. As none of these Sanskrit words were present in the Polynesian language with its many dialects, an evident discrepancy appeared between the generally accepted recentness of Polynesian migrations and the necessarily ancient introduction of Sanskrit into the Malay Archipelago, which had failed to affect any Polynesian ancestors.

Getting no satisfactory information from the results of comparative philology, Alexander (1910-11, p. 226) concluded: "The great differences in language and physique, as well as in mental and moral traits, between the Polynesians and the present inhabitants of the (Malay) Archipelago, combine with other consideration to prove the immense antiquity of the period when the Polynesians separated from the other branches of the Oceanic race."

As the theory of a direct Malayo-Polynesian unity of speech became more and more fluid, Polynesianists began looking for other possibilities. Colenso (1875, p. 405) wrote: "...the language spoken by the Polynesian race has no affinity with the Malayan, being in its whole formation and construction of a far more primitive and ancient cast. The structure of the Malayan language is wholly different." And: "That while some have supposed the [Polynesian] race to have sprung from the Malays, from a very slight physical resemblance, and from the likeness of a *few* words of their language, there is quite as much, if not greater, physical resemblance between the race and the people of Madagascar, on the opposite side of the globe, whose language also contains a few words and sentences which are identical."

Tregear (1886, p. 16), the noted Polynesian linguist, who compiled *The Maori-Polynesian Comparative Dictionary*, failed to find any near relationship to Malay or Indonesian tongues, and concluded that the Polynesians must have left Asia at some very early date. "But the main point against the late arrival of the Maoris from Asia is that many of their words have more direct connection with the Aryans of Europe, and even of the West of Europe, than with those of Asia."

Wallace (1883, p. 262), losing faith in the Malay theory, referred to the gradually accumulating linguistic evidence as he wrote: "This convergence of the views of three modern writers, each starting from a different point and reasoning from a different set of observations, as to the radical distinctness of the Malays and the Polynesians, will justify us in giving up the term Malayo-Polynesian as altogether misleading."

In the midst of theories which in the present century have tentatively linked the Polynesian speech with nations as widely spread as from Sumeria to India and China, from British Columbia to California, Mexico and Peru, there are still linguists who occasionally revive the idea of some indefinable Malay connection, claiming, like Ray (1923, p. 217), that "The old theory of a Malayo-Polynesian relationship has never been definitely disproven." Others, no less confidently, take the attitude of Wallace, maintaining that it is of more importance that the said relationship has never been definitely proved, and that the burden of proof rests with those who suggest it.

As Ray (1923, p. 217) states, the most notable denials of the Malayo-Polynesian theory have been put forward by Fraser and Churchill. The latter put forward the theory that the few words in the Indonesian and Melanesian languages which resembled Polynesian were borrowed from Polynesian mariners passing by from somewhere on the Asiatic continent. But Ray (1923, p. 218) in defence of the tottering Malayo-Polynesian theory, musters the following counter-suggestion: "As the colonies started from various islands of Indonesia, and at different periods in the development of the Indonesian languages, we naturally find that the Indonesian elements in Eastern languages—Melanesian and Polynesian—represent sometimes one Indonesian geographical region, sometimes another, ..."

Source relationship of Malay and Polynesian tongues

Therefore, in view of the available evidence, and the wide divergence of opinion among the linguists, we shall here be very careful not to draw any rash conclusion. The difference in the structure of Malay and Polynesian languages (Ranke), the absence both of true Malay words (Keane) and of the large class of ancient Sanskrit words (Humboldt) in Polynesian speech-material, and finally the exceedingly low percentage of Polynesian vocables that actually can be compared with Malay roots (Dixon 1921, p. 79)[1], have since the turn of the century left us with a combined linguistic result which may be thus summarized:

[1] Dixon (*Ibid.*) points out: "We may say just here that although there are undoubtedly some words in Malay that are connected with the Polynesian language, a careful analysis of the two made by the late Mr. Wm. Churchill, of

Some sort of parental contact between Polynesian and Malay languages must have existed, but apart from a number of common terms, the relationship is very vague and exceedingly remote. A parallel is here seen to the results of physical anthropology: A fairly close relationship is at first suspected; a systematic analysis reveals important differences and inconsistences, and yet, in the end, enough vague evidence remains to make some indefinable early parental connection likely. Available linguistic data suggest that whatever connection may have existed between Malay and Polynesian parental stocks must have ceased before the Malays left Asia and entered their present Indonesian Archipelago. This is important, as it takes the separation of Malays and Polynesians back to the early period in Asia—and to the geographical area on that mainland—whence the Yellow-brown race originally spread. In other words, the Malay and Polynesian ancestries seem to converge backwards in time, to meet somewhere in Eastern Asia in a very remote and indistinct period.

The possibility of borrowed words

Without losing track of this valuable piece of information, we may call attention to another detail with a possible slight bearing on the question. Even seventyfive years ago, Colenso (1875, p. 405) had an alternative conclusion to offer. He observed that the Polynesian, and not the Malay, was the roving deep-sea navigator in the Pacific, and the one that evidently possessed the greatest mobility. Combining this fact with the linguistic evidence and the continuous westward sweep of the prevailing elements in the open tropical Pacific, he laid down the following principles:

A: "That it would have been impossible for any regular migration to have ever taken place from the Malays to the Polynesian islands, owing to the frailness of their shipping, and to the prevailing trade winds and equatorial currents being contrary."

B: "That the near resemblance or even identity of a few (quasi) Malayan words prove really little, when it is considered (a) that those words only obtain among the sea-coast natives of Malaya; and (b) that the same words are found more or less in use on the same coasts of Java, Sumbawa, and the Philippine and other isles, including even Madagascar. May it not therefore be reasonably inquired, whether those few words might not rather have reached those several northern Asiatic isles from Polynesia, than vice versâ?"

Little attention has since been paid Colenso's remarkable proposition except perhaps by Handy, who similarly emphasized how wrong it was always to regard any apparent Malayo-Polynesian analogy as an argument for early Malay sailings to Polynesia, without ever taking into consideration the alternative possibility of a westward voyage by Polynesians. Handy says (1930 c, p. 13): "I believe in studying the river system downstream as well as upstream."

In fact, it is curious to see how so many, nearly all, have here followed the trek of aboriginal man 'upstream' only.

Others, without proposing a 'downstream' voyaging of Polynesians, have nevertheless

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the Carnegie Institution, Washington, resulted in his declaring that 250 words at the outside showed any connection, either as similar words or as words that probably had the same roots. If we state the census of Polynesian words that have been collected at the *very* low estimate of 25 000 words, this would give us a percentage of only one per cent.—not, we submit, a sufficient percentage on which to base a racial connection."

considered the Polynesians to be the mobile givers, and the people of the West Pacific the receivers. This was, as stated, the view of a competent Polynesian linguist like Churchill (1911, 1912) when he presented his theory that the few Polynesian-like words in Indonesia and Melanesia were merely borrowed from passing Polynesians; and of Lydekker (1921, quoted by Sullivan 1923), when he said of the Polynesian physical type: "They are Caucasoid in origin and it is probable that the Indonesians have a slight infusion of Polynesian blood rather than the reverse."

The frequent attempts to associate Polynesian speech with a general 'Austronesian' linguistic stock emphasize to some extent the nature of the relationship, and show beyond doubt that a geographical neighbourhood may create a linguistic pattern that defies the most conspicuous racial frontiers.

Language does not belong to race

Quite apart from the probable basal or source relationship between the parental languages, we shall therefore not ignore the evident possibility that a few sporadic words may have passed westward with Polynesian voyagers in more recent times, quite independent of any migration of race and language. Indeed, single terms can even travel without the company of human migrations. There are numerous Latin words in the Norwegian language, although there were no Roman settlers in the country.

More than a century ago, so keen a Polynesian observer as Ellis (1829, Vol IV, p. 433) pointed to the now recognized fact that the Melanesians who inhabit the Pacific islands westwards of Tonga "have an Asiatic origin entirely". The Polynesians inhabiting the islands eastwards of Tonga he suspected to be a mixed race, partly even of American descent. Showing how Polynesia and Melanesia meet in the Tonga-Fiji area, he particularly called attention to the probability "that the proximity of the Friendly and Figii islands may have given both a variety of words and usages in common, . . ."

To summarize, we thus have three plausible and natural causes for the existence of the fragmentary and sporadically appearing speech material which is shared by the island regions of the East and West Pacific. Firstly, the aboriginal inhabitants of both areas may be regarded as island survivors of primeval emigrants pursuing different routes out of the same cradle in Eastern Asia in early pre-Christian millennia.[1] Secondly, stray parties of roving East Pacific mariners may have landed in Indonesia after prolonged drifting with the trade wind straight down through the open water-wastes of Micronesia. Thirdly, whatever the Polynesians might have adopted during their marginal contact with Melanesia would basically be of Asiatic island origin. Each and all of these possibilities should be taken into account.

Speech alone is never a criterion of community of lineage. Fornander (1878) said with Sayce: "Language is no test of race, . . . If ethnology demonstrates kinship of race, kinship of speech may be used to support the argument; but we cannot reverse the process, and argue from language to race."

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[1] We know that linguistic elements tend to survive longer and in a purer form among island tribes than among more exposed mainland relatives. A historic example may be seen in modern Iceland where so many elements of the Old Norse tongue have survived in an almost pure form, although lost or greatly distorted among the continental Norwegians by whose ancestors Iceland was peopled in the ninth century A.D. Yet the Norwegian speech would tend to be sheltered from great changes by the continued use of a written language. The continental tribes from which the Polynesians descended had no written language, at least not in the period before Polynesian departure.

Since physical anthropology has failed to demonstrate a direct kinship of race, but shown that the Polynesian represents the antithesis of the Malay in nearly every detail, a much firmer and definite relationship in language would be required to balance the concrete evidence we have *against* a Polynesian descent from Malay people.

Other possibilities in Indonesia

We are not finished with Indonesia yet, since two gaps still remain in our reasoning. Although the Polynesians cannot have developed out of Malays, we have not yet considered whether the Polynesians may not be mongrels descended from Malays and some other unidentified race. There is also another possibility, which has often been substituted for the old Malayo-Polynesian theory in recent years, namely: the Malays may not themselves have made the journey to Polynesia, but they may have caused the voyage to be made by another Indonesian people, which thus became the Polynesians. We shall consider these two possibilities together.

The latter theory, as formulated by Weckler (1943, p. 8), is that the Polynesians dwelt in early Indonesia, as a Caucasoid people, before the advent of the Yellow-brown Malays from the mainland. On this premise, "the population pressure caused by the Malay invasion of Indonesia may have started the ancestors of the Polynesian peoples on their search for new homelands in the Pacific."

Only this much need be said: Polynesian ancestors in Indonesia would have had the opportunity to spread themselves all over that archipelago before the Malay population-pressure caused them to evacuate it. Are we to suppose that the courageous Polynesian warriors abandoned *all* their own settlements and made off upon the arrival of small Malay people from the Asiatic mainland? If so the character of all Maori-Polynesians must have changed greatly since then. They did not flee New Zealand when the Englishmen arrived.

We may very well accept the possibility that a big enough boatload of Malays may have driven Maori-Polynesians away from a settlement, a valley, or even a small island, but not that they cleared the whole Indonesian archipelago of tall and warlike Polynesians. It is unbelievable that every tribe throughout Indonesia should have fled in search of new homes in an unknown ocean upon the arrival of the first Malays; on the other hand, if the hypothetical Polynesian ancestors had not settled all the islands, there would have been no population pressure. Allowing that some exposed groups of Polynesians from one of the marginal islands may have deserted the fertile Indonesian archipelago in favour of the barren atolls of Micronesia, we must still wonder why there are no vestiges of the other and remaining Polynesian occupants of Indonesia. No physical type corresponding to the tall Polynesian has been pointed out in this archipelago, neither have archaeologists found any evidence of early Polynesian burials or settlements.

Pre-Malay Indonesians

Furthermore, the aboriginal pre-Malay population of Indonesia is by no means extinct. Their descendants, the true Indonesians, are as small and short in stature as are their neighbours, the Malays. Their average stature, as given by Haddon (1924, p. 22), is from

1.54 to 1.57 m. (5′ 0½″ to 5′ 1″) and their noses are as flat and soft as are those of the Malays. Pygmies and small negritto peoples, with a stature and nose of even less comforting dimensions, probably preceded the pre-Malay 'Indonesian'. Present conditions in Indonesia, with Hindus and other recent immigrants from continental Asia intermingling with Malay and aboriginal Indonesian tribes, have formed a mixed population rendering the field-work of anthropologists difficult, while the constant confusion in the terminology of 'Malay' and 'Indonesian' has not simplified matters for the library student. Yet, out of this apparent chaos of mixed races, several facts emerge unshattered which may permit us to draw valuable conclusions.

By turning our attention from stature to the information yielded by a study of blood groups, we are back on solid ground. Obviously, the fact that the original Indonesian people, like the later Malay intruders into the Indonesian domain, all display a notably low stature, speaks strongly against a Polynesian descent from these people, separate or combined; yet, if the Polynesians are a composite race, having derived their exceptionally tall stature from some quite different quarter, then bodily form and size would not prevent Indonesians from having entered the East Pacific as *one of the component elements* in the Polynesian race.

This is where the blood-factors again come in. The Malays, the true Indonesians, the Indonesian negrittos, the recent Hindu and Chinese immigrants, all happen to have one important physical characteristic in common; they are all notably high in the B factor. Since we know with certainty that blood group factors are hereditary and that A and B factors behave like usual Mendelian dominants, it is simple mathematics to reckon that B cannot entirely disappear, whatever distance Indonesian people travel in a boat and however much their blood is crossed with that of other peoples. Some percentage of B is bound to remain among their descendants. There is, as stated, no B in the aboriginal islanders of the more isolated areas of Polynesia, like Easter Island, Mangareva, the Tuamotus, etc., islands all settled by typical and genuine Polynesians. It is accordingly a violation of Mendel's law, applied to the inheritance of blood group factors, to suggest that there is any proportion of Indonesian blood worth speaking of in the veins of the Polynesian people.

There is another point with regard to the replacement of the Malay theory by another hypothetical movement from the same archipelago. It is suggested that a Caucasoid non-Malay people was expelled by alien Malays, rather than that the Yellow-brown Malays themselves voyaged to Polynesia. If the pre-Malay people was Caucasoid it would not be very likely to speak the Malay language. Therefore, with this Caucasoid Indonesian theory, the original linguistic argument is lost, and with it the principal argument for a Polynesian arrival from Indonesia.

Those who abandon the old and battered Malayo-Polynesian theory only to replace the Malays by a hypothetical and unspecified tribe which *might* have dwelt in early Indonesia, and which might have been tall and light-skinned and without the B-factor, are surely seeking for a plausible excuse for maintaining the Indonesian theory rather than being pressed by the existing data. By pushing hypothetical relatives of the Polynesians into the remote past of the archipelago we do not, however, push them out of the range of further discussions. The subject is thereby only transferred from the field of the physical anthropologist and linguist into that of the historian and archaeologist.

A recent arrival of man in Polynesia

A people is marked and classified not merely by its physical characteristic and language, but also by its culture. To reconstruct cultural conditions in and around the Polynesian territory at the time of the Polynesian migrations, it is necessary to know approximately when these early voyages into the East Pacific took place.

The absence of written history in Polynesia, and the silence, among all literate nations, regarding expulsions or emigrations into the open Pacific in pre-Columbian times, make an exact dating of the Polynesian migrations impossible. Yet we are not deprived of other means, more approximate but no less dependable than writing, which all combine to demonstrate the recentness of the Polynesian occupation of their present islands.

Before we consider the various positive indications of this fact, we may observe that there is nothing to argue the contrary, nothing to prove any antiquity of man in the East Pacific. A primitive fossil species of the coconut genus (*Cocos zeylandica*) has been found in the Pliocene of New Zealand (Berry 1926), but it is an early wild species which has no bearing upon the dating of human migrations. A cranium was once found underneath the coral bed below Honolulu (Hunnewell 1868, p. 3), but the head must either have been buried there, or else have belonged to a native diver trapped and carried into underwater channels, as no skullbone would endure such prolonged submersion among growing coral-polyps.

Shallow archaeology

Throughout Polynesia there is in fact a remarkably shallow archaeology behind the island culture. In contrast to the long inhabited neighbouring territories, like the adjacent coast of Peru, there are in Polynesia no impressive shellheaps, kitchen-middens, or other accumulated human deposits which can carry the archaeologist far back into the millennia before our own Christian era. Shallow refuse-heaps have been found near early settlements in New Zealand, Hawaii, Tonga, Tahiti, and other islands, but they do not carry us back for very many centuries of our own era before they suddenly disappear. In 1950 Emory, noted archaeologist of the Bernice P. Bishop Museum of Honolulu, excavated to completion a rock shelter at Kuliouou, Oahu, which was considered one of the earliest known sites in the Hawaiian group, and he was able to secure the first direct dating through the recently developed Radio-Carbon Method.[1] He found that the site was unoccupied right up till about 800 A.D., and possibly even later. Emory says[2]: "This carbon determination brings me to regard a date like 700—800 A.D. for the first settlement of the Hawaiian Islands, as entirely reasonable and likely."

In New Zealand all the environmental conditions should be present which permit continental peoples to leave behind deep and extensive kitchen-middens or refuse-heaps as centuries pass by. Duff (1949; 1950 a; 1950 b) has published the latest archaeological results from New Zealand in his interesting studies of the Moa-hunters, who were the first settlers of this Maori habitat. He found no sign of great antiquity behind any New Zealand settlement, and says about the Wairau site in the South Island (1950 a, p. 75):

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[1] As explained at the 29th Int. Congr. of Americanists, by Mr W. F. Libby, chemist of the University of Chicago, dating by Radio-Carbon Contex may be done from organic material recovered in archaeological excavations, from the extent of disintegration of the radioactive Carbon-14 atoms contained in such material. The dating thus obtained is believed to be correct within a margin of 250 years each way, somtetimes less.

[2] Letter to the author dated March 30, 1951.

"Although the oldest recorded, the site is thus typical of New Zealand in the shallowness of the deposit and in the absence of stratification."

His general conclusion is (1950 b, p. 1): "There is no evidence that human eyes had ever seen these islands before they were raised by the ancestors of the Polynesians in one of the world's last and most remarkable migrations of stone age man, which, according to the date accepted as a working hypothesis from Percy Smith's study of genealogies, we can tentatively assign to the fifth century A.D."

In no other parts of the Maori-Polynesian territory have refuse-middens been found to possess a size suggesting long-lasting habitation. Where work has been done other than on the surface, archaeologists have not only failed to find evidence of human occupation prior to a period well advanced into the centuries A.D., but, apart from an occasional claim of culture blending, very little evolution is found to have taken place in the island culture from between the early settlers and the arrival of Europeans. In other words, the stone adzes, weapons, stone pounders, and other artifacts of the first voyagers to enter the East Pacific were very much like those still in use on the arrival of the early European explorers. This fact greatly simplifies matters, since a general cross section of the fairly homogeneous culture on the various Polynesian groups, as known to us in historic times, will present a comparatively good picture of the culture among the natives who made the original journey out to the islands.

Limited inter-island variation

When compared with other geographical territories of far less extent, Polynesian culture is remarkably homogeneous. Although some islands are in the tropical belt and others in the cool latitudes of the Chatham Islands, with tribes dwelling as far apart as the Maoris of New Zealand and the Hawaiians of the Sandwich Islands, yet the various cultures have not had time enough to show much local differentiation.

This fact becomes even more noticeable when we consider the Polynesian language. Throughout the Polynesian territory written language was unknown, yet on all the widely separated islands the inhabitants still spoke the same language with mere variations of dialect; and they referred to the same mythical places and persons and gave the same names to important legendary heroes in songs and traditions of the past. Captain Cook, on his voyages of discovery, took one native Polynesian along in his ship, and he was able to act as interpreter even among remote and to him unknown Polynesian tribes, some of which had been discovered by Cook at different extremities of Polynesia.

Mutually isolated people, without a written language, do not maintain a common tongue unless their separation has taken place in comparatively recent times.

Brown (1927, p. 5) draws a suggestive comparison with the neighbouring islanders of Melanesia, who have occupied their present island territory since very early human times: "... a contrast between the two regions is that every island in Melanesia has its own language, and often several, Bougainville having six, and adjacent villages all over using mutually unintelligible languages. In Polynesia it is easy for a Maori to understand Tahitian or Hawaiian, though bred and spoken several thousand miles away."

The absence of early human deposits in Polynesia, the shallow as well as homogeneous Polynesian archaeology, and the scant differentiation between the geographically widespread tribes, all point in one direction, and combine to show the recentness of the Polynesian dispersal into the East Pacific. Many centuries, then, cannot have passed between the original discovery of Polynesia by its aboriginal population and the re-discovery of the same islands, at the end of the 16th century, by the Spanish Mendaña expedition from Peru.

The value of genealogical cross-bearings

On all the major islands throughout Polynesia the native population were passionate ancestor-worshippers. Superior chiefs, often represented by a royal hierarchy, were deified, and the ruling classes, therefore, kept a very careful record of their own sacred ancestors right back into legendary times. When the Europeans arrived the Polynesians on all the islands kept careful genealogical records. On some islands (New Zealand, Marquesas, Easter Island) there was a regular school system, with teachers trained in the local history, who instructed the young men in the national past and taught growing generations the genealogy of their own tribe. Memory was sometimes aided by a fully dependable substitute for written history; a mnemonic system was arranged by means of strings on which knots were tied for each new generation. (See further Part IX.)

The native genealogies, with which each Polynesian tribe has kept for itself a careful track of the number of generations since its own particular island was first settled, are rendered considerably more valuable by the fact that quite independent records were kept in the different islands.

As Buck (1929, p. 7) states: "The Maoris, with their blood-kin in Polynesia, offer of all races in the world the best material for investigation by the 'Genealogical Method'. ... The fact that the genealogies are joined on to the Gods and natural phenomena in no wise lessens their value for the last thousand years. They are the only means we possess of arriving at approximate dates in Maori history, and their value is very great."

At the turn of last century, Polynesian genealogists like Ellis, Fornander, Smith, and others, had compiled and compared tribal genealogies from wide areas of Polynesia. We learn from them that there is a close agreement from island to island that the various family-lines were established throughout Polynesia some 25 to 28 generations ago, sometimes slightly more, and sometimes a little less, a variation which is only to be expected since the length of a generation may vary, and since the different groups were settled successively and not all at one time. Yet the agreement is remarkable and cannot possibly be the work of chance. In many cases the royal lines from different islands converge backwards to common ancestors referred to independently by the same names and in the same periods; and in most cases the original mythical demigods, like Tu, Tane, Tangaroa, Tiki, Maui, and Rongo, with their sister-wives Hina, Pani, etc., recur as the first divine progenitors common to the now scattered Polynesian royal lines.

As experience has shown that an average Polynesian generation is equivalent to a period of about 25 years, the genealogists have come to the conclusion that an all-embracing

Polynesian vortex of migration swept the East Pacific and peopled all the major Polynesian islands in the early centuries of the present millennium, finally bringing the Maori to New Zealand as late as the fourteenth century. As Buck (1926, p. 184) states: "All tribes in New Zealand trace their ancestry back to one or another of those canoes which are famous in song and story. The arrival was from 22 to 23 generations ago, or approximately about the year A.D. 1350."

Polynesian traditions indicate two distinct local occupations

Historical traditions preserved in most parts of Polynesia speak of two successive island eras. Giving their own local genealogies, the Polynesians inform us that their own forefathers, when sweeping into the ocean in large canoes some twenty to thirty generations ago, found another and different population already in possession of the islands. These former inhabitants were partly expelled and partly absorbed by the newcomers. In certain islands, however, there was only a change in the ruling families, enabling us, through other and earlier genealogical lines, to go still further back to a period generally considered by Polynesianists to commence somewhere about 500 A.D. This was the earliest settling of Polynesia.

We may infer from this the possibility of a mixed origin of the present Polynesian race and culture, yet, if this be correct, we can still deduce that both these branches must have arrived in the East Pacific without the hereditory B factor in their veins.

The probability of a mixed origin of the Polynesian islanders has already been indicated by the results of physical anthropology. Irrespective of the origins of the possibly unrelated settlers of Polynesia, and their respective routes of migration or means of transport, it may still be presumed that the latest invaders, who entered Polynesia in the present millennium, are responsible for the cultural standards and the prevalent physical types encountered in Polynesia at the time of European discovery. For the sake of convenience, the term "Maori-Polynesian" will be used in this work to distinguish the last arriving and well known immigrants of the eastern parts of the Pacific, who reached Central Polynesia in the first centuries of the present millennium and thence sent a branch which conquered New Zealand with the famous Maori fleet about 1300—1350. This term will consequently include their descendants, that is the dominant type of Polynesian aborigine as known to us throughout Polynesian territory, including New Zealand, in historic times. Whether the well-known present Maori-Polynesian and his extinct or absorbed predecessors on the same islands be of one or of two distinct branches of mankind, it will be found the safest procedure to study the last and best known immigrant first, and then return later to the original navigators who discovered the islands when still unknown to man, in the middle of the last millennium, some five centuries or more before the Maori-Polynesians appeared in the same part of the ocean.

It is hardly justifiable—although it is generally done—to determine Polynesian migrations and historical events into decades by a genealogical calculation. With a line of up to 28 Maori-Polynesian generations, we might easily calculate a century wrong if there was any irregularity in the lifespan and line of inheritance of any of the chiefs whose names are enumerated. A total of some fifty generations, including the earliest local lines, will allow of even more flexibility when transformed from a calculation in generations to a calculation in years and centuries. Until comparative chronology, some day in the future, provides us with even more exact information, all dating in Polynesian history must be considered as approximate. Data, which undoubtedly correspond with the truth when handed to us by the Polynesians as a given number of "generations", cannot with the same correctness be transformed into an equivalent number of "years".

Yet, by accepting the general results of comparative genealogy supported by the other means of approximately dating local Polynesian history, we may allow for a narrow margin on both sides, and still be sufficiently close to the facts when we conclude that Polynesia was generally uninhabited up to the middle of the last millennium; and that it was rediscovered and conquered by the Maori-Polynesians who arrived in the first part of the present millennium to establish their local hegemonies over all the islands.

With this information to guide us we may consider some noteworthy facts pertaining to the Polynesian culture.

Polynesia occupied by neolithic tribes

When the Europeans first discovered the Pacific Islands, the Polynesians were still a pure stone age people. Throughout Polynesia, without exception, the natives manufactured their adzes of polished stone, and their fish-hooks of shell, wood, bone, and stone. No form of metal was known.

The beautifully executed and highly polished stone utensils of the artistic Polynesians place their culture in the upper—or 'polished stone age'. In other words, Polynesian culture was neolithic. And what is more, the Polynesians did not know the exceedingly ancient art of pottery. This is one of the most surprising features to be found among the highly intelligent and, in most other respects, culturally advanced islanders of the East Pacific. The neolithic state of Polynesian culture has been commented upon with surprise by most observers, but few have taken this significant evidence into account in their attempts to reconstruct the Polynesian migrations in our own Christian era. Others, who have paid due attention to the fact, have proposed strange explanations, or left the question entirly open.

In his inquiry into "The Knowledge and Use of Iron among the South Sea Islanders", Rickard (1932, p. 21) shows that no metal of any kind was manufactured in Polynesia before the introduction of European nails. He says: "Whether we accept the time of their departure from the Asiatic mainland as either B.C. or A.D., it is remarkable that the descendants of the Polynesian migrants to the Pacific islands should have lost all knowledge of pottery and metals. ... Apparently we have here an interesting example of retrogression in human culture."

However, in view of the markedly high artistic talent shown by Polynesian woodcarving and stone-sculpture, a retrogression in tools and instruments bringing the Polynesians back from the iron age to the cumbrous stone age does not quite seem to harmonize. We should be very careful not to discard without serious consideration this surprising piece of evidence, for we may here be touching an unsuspected key to the local migratory problem.

Why should an entire people, consisting of numerous mutually isolated tribes, unanimously drop the use of metal to start chipping and polishing inferior tools of stone? Only one theory has been put forward to answer this problem: the Polynesians might not have had access to iron in their new domain. But this is not so. Captain Cook (1768—71, p. 156) noticed, upon his first visit among the New Zealand Maoris in 1769: "We found, thrown upon the Shore in several places in this Bay, a quantity of Iron Sand, which is brought down out of the Country by almost every little fresh-water brook. This proves that there must be of that Ore not far inland. Neither of the Inhabitants of this Place, nor any other where we have been, know the use of Iron or set the least Value upon it,..." Polack (1838, p. 342) similarly wrote about certain round stones full of iron pyrites which were "somewhat abundant", and were known to the Maori as "moamoa", but they had no idea that the iron could be smelted and thus become useful to them. As is well known, there is iron ore in New Zealand, and when its occurence was conspicious enough to be commented upon by the earliest European voyagers, it could nor have been overlooked by the aboriginal settlers.

If the Polynesians had come from the west they could easily have returned with the trade winds to the bordering islands of Melanesia to obtain metal ore, which even today is abundant for commercial use no further away than New Caledonia. The early Mendaña expedition, when visiting the Solomon Islands, noticed that the natives seemed to have had full *access* to iron, as they were observed using a club with a stone head containing quantities of iron pyrites.

Thus, both within the Maori Polynesian habitat and on the islands nearest to it, iron, as raw material, was accessible. There would be no need for the roving Polynesian mariners to abandon the use of the forge, and with it the use of axes, swords and daggers, had their ancestors ever been iron-smiths.[1]

Polynesian immigrants imported their neolithic culture

Worked metal has never been excavated from prehistoric Polynesia. This is negative evidence, however, and as such is valid as an indication rather than a proof. Yet we may verify from other observations that the Polynesians arrived with their primitive ancestral adze-heads worked from polished stone and not from iron.

An iron-age people forced to revert to the manufacture of neolithic culture elements would attempt to imitate metal tools in stone. But the Polynesian adze-blades and other tools represent typical neolithic forms and show no similarity to any known prototypes in metal. An alternative possibility would be that the Polynesians found stone imitations of iron prototypes to be impracticable, and that they were thus compelled to invent and evolve tools of other and more primitive form. However, a gradual retrogression from cast iron to polished stone, after the occupation of the Polynesian islands, would result in a differentiation among the respective island tribes. Inventions and evolutions would yield different results as the carpenters and sculptors began experimenting all over again on forming stones into useful tools. But the evidence in Polynesia is to the contrary. The same types of neolithic tools were spread with the arriving immigrants to remote parts of Polynesia. The same conventional forms of adze-blades, the same characteristic mode of securing the stone to the elbow-shaped handle, the same distinct type of curved shell fish-hook, or barbed wooden ruvettus hook, reappear from one island to the next throughout the whole of Polynesia. These, and many other corresponding culture elements in eastern Oceania, are purely neolithic in character, they are the result of long-lasting evolution among intelligent and laborious stone age people before their spreading, and not the casual invention of independent island tribes or of a retrograde nation.

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[1] Maori traditions, it is interesting to note, narrate that the local existence of nephrite and similar green stones (but not iron-ore) was the material which attracted their ancestors to New Zealand.

No pottery among Maori-Polynesians

The absence of worked iron among the Polynesian tribes, before they began to trade with European ships, has a parallel in the absence of pottery, which is perhaps even more remarkable. Many ethnologists consider the potter's art to be a culture element of such basic importance that they separate culture groups principally according to the quality of their ware and their modes of manufacture and ornamentation. Some even argue against racial diffusion in certain areas by pointing to local differences in ceramic art. The absence of *any* form of ceramic art, as in historically known Polynesia, ought to prove even more valuable to the plotting of ancestral migration routes. Since pottery generally antedates metal and was produced by most stone-age cultures from the beginning of their neolithic stage, the total absence of this important culture factor, when the Polynesians were discovered by Europeans between the sixteenth and eighteenth centuries, ought to be thoroughly analysed. For it must either be due to the geologic-pedologic conditions on the Polynesian islands, or else to some peculiarities in that special area whence the latest Polynesian immigrants arrived.

The discoverers of isolated Easter Island thought they had seen some pottery jars among the local inhabitants (Behrens 1737, p. 135), but this has never been verified by subsequent visitors, and might have referred to the pottery-like gourd-containers used on the island. All anthropologists agree that pottery was not made by any of the Maori-Polynesian tribes at the time of their first contact with our civilization. But when the reason for this surprising fact has to be explained, there is no longer agreement. Many have suggested, as they did with iron, that there was no clay for making pottery in the Polynesian islands, and that this valuable ancestral art had therefore to be forgotten. This is not so. Clay was available on all the major volcanic islands, although often not of the best quality. It was used by native Polynesian women for washing cloth, and by their men to plaster around sections of the wood when burning down trees or hollowing out the hull of canoes with fire. The Maori even made some of their flutes of baked clay. (Fisher 1937, pp. 111—115.)

The fact that clay is extensively used in an elaborate form of pottery-making on the very first alien islands west of Polynesia—in Fiji, a Melanesian group,—is enough to show that the distribution of pottery in the Pacific follows an ethnographic rather than a geologic-pedologic pattern. Mac Lachlan (1938, p. 82), discussing the sudden disappearance of pottery-making as one crosses the border from Melanesia to Polynesia, refers to yet another rather ingenious theory put forward to make this peculiar culture pattern concur with a supposed migration from west to east. According to this hypothesis, certain families or individuals might have had a "monopoly of the industry. If then these groups of monopolists were universal, the destruction of even a few people through warfare, disease, or volcanic action, would cause the disappearance of their products from the material culture of their dependants, who might number many thousands." MacLachlan himself does not seem to be too impressed by this ingenious proposal, and one would wonder why the "pottery monopolists" should by disaster disappear so completely from all the islands *east* of Melanesia. Surely, the manufacture of pottery is not so complicated that other tribal members, at least of *some* of the pottery-making communities, could not take over its production.

Without resorting to fabulous explanations we cannot escape the evident fact that Polynesian material culture was never based on pottery-making. It was, from the earliest stage of the Maori-Polynesian departure into the ocean, based on and typified by a stone-lined earth oven, in which food was baked between heated stones, as a substitute for cooking in waterproof earthenware. The same peculiar earth oven is typical of all Polynesian tribes, from Hawaii to New Zealand or Easter Island. As an ancestral culture element it was carried along by the tribes which invaded Polynesia at the beginning of the present millennium, and instead of pottery the earth oven was spread with these recent Maori-Polynesian mariners wherever they settled in the East Pacific.

Other evidence of an antique form of culture in spite of the recent arrival

It is also a suggestive fact that, when the same Maori-Polynesians arrived on the islands, a few centuries before the Spaniards, their idea of agriculture was primitive, as they brought no cereal cultivation; their architecture was equally primitive, as they knew neither the principle of the arch nor the use of cement; true weaving was impossible to them, as they had not even the simplest form of loom; they had not acquired even a primitive form of currency or monetary system; and they were wholly unacquainted with the wheel. All this in spite of an exceptional intelligence and a very high development of culture along other and more unusual lines.

Where then had the Maori-Polynesians been since the dawn of human history, that their culture should develop in this remarkable direction without becoming familiar with such elementary and useful culture elements as pottery, metal, the loom, the wheel, the arch, or currency? Their absence among all the far-flung Maori-Polynesian tribes is a matter that demands full attention. Until we have succeeded in finding some comparable ethnographic locality outside Polynesia, typified by a general cultural level at least matching that of the widespread Maori-Polynesian tribes in these their most fundamental and universal peculiarities, we have no right to draw far-reaching conclusions from casual parallels and analogies of a less penetrating nature.

The chronology of the East and the West Pacific

When in due time Polynesian historical traditions are taken into consideration, we shall see how the Polynesians had preserved memories of a vast and mountainous *Tua-Whenua*, or mainland, where their ancestors originally dwelt before entering upon the journey into the open Pacific. (Percy Smith 1910 a, p. 58.) They tell us—and quite independently on widely separated Polynesian islands—that the first land discovered and settled by their ancestors in the ocean was an island, or rather a group of islands, referred to in most Polynesian dialects as Hawaiki, in others as Hawai'i. While some remained to settle this Hawaiki or Hawai'i, others spread from there all over the East Pacific to discover and occupy the islands inhabited by their descendants today. During the first generations after the dispersal of the Maori-Polynesian people from Hawaiki, courageous mariners, from all the major islands, made return voyages to this the first discovered island, to visit their relatives and the earliest Pacific abode of their sacred ancestors. A lively contact existed between the central Polynesian islands and Hawaiki, and even between New Zealand and Hawaiki, until this great maritime activity gradually ceased. The historical traditions of the New Zealand Maori are especially rich in detailed accounts of the arrival of their ancestors from Hawaiki and subsequent return voyages to the same islands. This took place after the Maori-Polynesian immigration of the East Pacific, well into the fourteenth century of our own Christian era.

Philologists soon discovered that Hawaiki or Hawai'i was a composite word, with iki or i'i as a descriptive epithet, and it was suggested that the name Hawa-iki was a Polynesian reference to Java. This theory was widely accepted in the last century, and frequently appears in literature even today. (Fornander 1878; Weckler 1943.) Apart from the rather doubtful proposition of allowing the Maoris hypothetical return voyages to Java in their prehistoric craft, we shall have difficulty in fitting the peculiarities of neolithic Polynesian culture into the historical picture of Java in the same fourteenth century. Java had entered the iron age, and developed close trade relations with the leading Old World civilizations of the East and the distant West, more than a thousand years before the Maori-Polynesian tribes ceased their sailings between Hawaiki and their respective islands in the East Pacific.

Polynesian culture, as it became known to us, was a typical maritime culture. This was only natural, as any island people, dependent upon the sea for food and inter-island communication, would be forced by nature to improve their craft and develop marine skill, whatever their national characteristics were in their previous habitat. Yet the mere fact that the ancestors of the aboriginal Polynesians had managed to land on lonely oceanic islands provides interesting testimony.

If they had come from the east, from America, they could have reached Polynesia even against their own will and intention, merely by clinging to any buoyant coastal craft that was driven to sea and carried west by the prevailing winds and currents. But, if they had come from the west, from Asia, they could have reached Polynesia *only* if they were already, before departure, expert mariners with a keen insight into navigation and highly developed craft with rigging capable of forcing an eastward journey against the prevailing wind. We are at present dealing with the latter of these two alternatives, a possible arrival from the Old World.

In Asia—at least in the coastal areas where the evolution of such a maritime culture must necessarily be sought—the stone age had been left behind at a much earlier period than that in which the Polynesian migrations took place. Great trading civilizations, renowned for their jewellery riches and splendour, had taken over the coastal waters from Japan and China to Java, India and the world further west for a conspicuously long time. There were some very few intellectually undeveloped and backward peoples that dwelt in isolation without any seafaring or trade, and thus remained pure savages even into modern times; but such people are not likely to discover oceanic islands hidden from them thousands of miles away beyond Australia. Certainly such isolated and backward people were not the illustrious forbears of the Polynesian pioneers.

There were indeed a few more intelligent peoples in isolated spots in the interior of India which also retained a neolithic culture unaware of developments in the outside world. But the Polynesian ancestors cannot have lived in such interior isolation. If they had, as soon as they had crossed the mountains and jungles and reached the coast they could not have avoided contact with high cultures and coastal traffic from east and west. Certainly, an isolated mountain tribe from Assam, or a savage people from the jungles of Central India, could hardly be expected to reach the sea and build a fleet of deep sea craft without being affected by neighbouring civilizations, steer their stone age craft through Indonesia, set out on further oceanic voyage in the teeth of the trade wind, pass 4,000 miles of Micronesian territory, or the continent of Australia, and all the densely inhabited Melanesian islands, to steer further east into the unknown ocean in deliberate search of the nameless, undiscovered islands of Polynesia.

The discovery of Polynesia by stone age man cannot be reasonably explained by such purely speculative theories.

If Hawaiki had been Java, the early Polynesian voyagers would have been familiar with the highest civilizations of the contemporary world. Although North and South America was still *terra incognita* to European civilization at the time of the latest Maori-Polynesian migrations, Indonesia was not so. European voyagers, such as Marco Polo, had entered Indonesia before the New Zealand Maori had left their Hawaiki. Yet our own civilization was much too late to be the first to introduce iron, the wheel, loom, or pottery into the Indonesian domain. A thousand years before Indonesia was opened up to our own western civilization, the Arabs had already extended their trade to Java and other principal Indonesian islands, and by 950 A.D. had carried their activity so far into Indonesia that they had seen and described strange animals that carried their young in a pouch. Such marsupials do not exist on Sumatra, Java, or Borneo, but only in Celebes, Flores and islands to the east, and the true kangaroo is not found further from Australia than in the Aroe and Kei Islands south of New Guinea. (Hennig 1937, Vol. II, p. 352.)

Like the Arabs of the earliest centuries A.D., the Romans, too, had trade relations with Indonesia long before the arrival of our own civilization in these waters. We learn from the second century geography of Ptolemy (Book VII), that the Romans of his day had detailed knowledge of the coasts of India, Indo-China, Sumatra, Java, and China.

Majumdar, in his study of *Ancient Indian Colonies in the Far East*, also stresses the commercial connections between Indonesian waters and other leading world civilizations which traded with the inhabitants of this continental archipelago from very early times (1937, Vol. II, p. 4): "This was particularly true of India and China which were the nearest countries to the Archipelago that possessed a highly developed civilization from an early period. There was a regular maritime intercourse between India and the Far East as early as the first century A.D. This is definitely proven by the statement in the Periplus that ships from Indian ports regularly sailed to Chryse (Indonesia), and there was a brisk trade relation between the two."

We also learn directly from Chinese annals that China, with its high oriental civilization, had intimate maritime contact with the Indonesian Archipelago from a very early period. Heine-Geldern (1945, p. 147) agrees with Flines that Chinese colonists or merchants must have lived in Indonesia as early as the Han period[1]. The same author speaks of "direct Chinese influence in Indonesia" which goes back "at the very latest to the first century B.C. However ... one can hardly avoid the inference that Chinese contacts started at least as early as the beginning of the third century B.C., and possibly earlier."

In the midst of all this foreign trade and influence in early Indonesia, it was still the ancient civilizations of India that had by far the greatest effect. Alexander (1910-11, p. 227) writes: "We learn from Javan traditions that from and after 300 B.C. several successive waves of emigration from eastern India entered the Archipelago, bringing with them the Hindu civilization of that period, the Buddhist religion and the art of writing; besides a large number of Sanskrit terms, of which no trace can be found in the Polynesian dialects."

It might well be added that neither is there any tradition of Buddha, nor any vestiges of Hindu civilization in any one of the numerous Polynesian islands. Yet they were all peopled from Hawaiki—and maintained direct relations with that important place—about fifteen hundred years later than the period here referred to in Java. Not even in Micronesia have such traces been found.

When the old civilizations of the Asiatic mainland first reached the Indonesian archipelago, they soon spread, to leave an ineffaceable impression upon the local cultures of all seafaring or coastal nations in that region. Handy (1930 b, p. 101; 1930 c, p. 17) presents the following picture of Indonesia, at periods when the Polynesians still dwelt in their fatherland:

"Just about the beginning of the Christian era Indians, coming by sea, were founding great and enduring kingdoms in Sumatra, Java, Borneo, Cambodia and Annam. Archaeological and historical evidences indicate that the cultural influences were emanating largely from South India where there were, on both the Malabar and Coromandel coasts (southwest and southeast) powerful maritime kingdoms—which traded with Asia Minor, Africa, and Rome on the west, and also the Far East. A very great maritime empire called Sri Vijaya, having its capital at what is now Palembang in East Sumatra, whose power compassed the coasts of India, Indo-China and Java, flourished in Malaysia from early in our era until the thirteenth century." And: "From its earliest period it was Buddhistic. Its capital in East Sumatra was in especially close relationship with Buddhistic Bengal, as a centre of Buddhistic learning it ranked with the greatest in India, and was the chief focus of Mahayana Buddhist influence in Indonesia."

Even in the central parts of Indonesia, these early maritime traders established themselves among the aboriginal population, with all the contemporary possessions of civilized man, from iron, jewellery, glass, and fine textiles, to wheeled traffic, and the writing in true alphabets. As Majumdar (1937 Vol. II, p. 131) states: "Thus we have to conclude that Hindu colonists, direct from India, settled in different parts of Borneo during the early centuries of the Christian era." And (p. 127): "The inscriptions leave no doubt about the thorough-going nature of the Brahmanical religion in that locality. The Brahmanas evidently formed an important element of the population, and the Brahmanical rites were in great favour at the court."

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[1] The Han dynasty lasted from 206 B.C. to about the time of Christ.

Harrison (1949, p. 24) has shown us that outside maritime influences of amazing antiquity have affected even the primitive Kelabits, isolated in the highest inhabited area of central Borneo: "The dominating feature in their scale of values is comprised of large pots and jars, mainly of Chinese origin. . . . Beads are second in the scale of values. . . some of the most esteemed types being extremely ancient, having been identified with material from B.C. Damascus and Ur of the Chaldees."

The iron age of Indonesia

The use of iron seems to have entered Indonesia from the west. Beyer (1948, p. 65) states that true iron culture had spread to the Philippines no later than at the close of the second century B.C. and not earlier than the third century B.C., reaching these islands from South India and by way of the Malay Peninsula and Borneo.

Heine-Geldern (1945, p. 148) notes that by the first or second century of our era iron was in general use in the Indonesian Archipelago, as this convenient culture element "spread more rapidly than Hindu culture". This does not imply that iron only found its way to the archipelago with the Hindu colonists. The same author describes how an earlier culture had reached Indonesia from the mainland, and left its megalithic tombs on the islands during the centuries before the Christian era. Even these early people were not neolithic, as they have left the following evidence of their own cultural level (*Ibid.*, p. 150): "It will be seen that all the stone cist graves and slab built graves of South Sumatra, Central and East Java contained glass beads and metal, bronze, gold, copper or iron. The same was the case in similar graves that have been investigated in the Malay Peninsula."[1]

It is most unlikely that the Polynesians would flee at the mere sight of the arriving Hindu traders, without deriving any benefit from the inventions and merchandise they had to offer. They did not flee when the Europeans penetrated Polynesia, but they swarmed over the foreign ships to exchange merchandise, and were most excited at their first contact with iron, being willing to offer high prices even for an old nail. History also certifies how ferociously the Maoris fought in New Zealand to defend their ancestral soil against the invading Europeans, though these had the advantage of fire-arms. Such people would not flee from Asia at the sight of foreign traders.

Returning again to aboriginal Indonesia, Majumdar also (1937, Vol. II, p. 32) shows that, in the same remote period before the Hindus arrived from the mainland, "the Javanese possessed a high degree of civilization." He assigns also to that period "active trade-relations with foreign countries" and shows how the aboriginal population of Java had "developed various industries and excelled in making various articles of iron, bronze, copper, silver, gold, ivory, tortoise-shell, and horn of rhinoceros."

In prehistoric graves on Java, over 2,000 years old, we can still find objects like iron lance-points and short iron swords "properly ascribed to the people or peoples who settled in Java before the Hindu colonization." (*Ibid.*, p. 27.) We find nothing similar in Micronesia and Polynesia, not even a single piece of scrap metal before the arrival of modern European traders. We may thus infer that the Polynesian and Micronesian ancestors were not in contact with the Malay Peninsula, Sumatra, Java, Borneo, or the Philippines during at least the last two thousand years, and not with central Indonesia since the earliest centuries A.D. The Polynesians, so keen to acquire the least bit of iron when first seen on board European ships in the 17th and 18th century, would have adopted the iron forge, or at least secured valuable bits of iron through foreign trade, had their 6th to 14th century ancestors ever lived in contemporary Indonesia or had access to that territory. The stone age state of Polynesia is one of the safest cultural indications of the vast span of time that must have elapsed since the aboriginal peoples of Indonesia and Polynesia severed their ancestral contact.

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[1] Cfr. also Heine-Geldern 1950 b, p. 184; Heyerdahl 1951, p. 74.

Pottery in Indonesia

Wallace (1883, p. 498) wrote: "Not less clear, as evidence of the very remote antiquity of the Polynesians, is the absence of the art of making pottery among the whole of the race; for it implies that they left the continent or the western islands before the art was known, its practice being so simple and at the same time so useful, that, once known, it would certainly never have been lost. But on all the great continents and continental islands this is a universal and very ancient art. There is not a single tribe in the whole Malay Archipelago but what possesses it; and there is evidence in many parts of the world that it dates back into prehistoric times, and even into the polished stone age. In Eastern Asia, where it attained a high development much earlier than in Europe, it is certainly of extreme antiquity." If there is, among the great multitude of Malay and Indonesian tribes, an occasional group, like the Apayaos and Ilongots in Luzon, which does not itself actually make pottery, they still use it and know the art, and would undoubtedly have made their own ware whenever deprived of their present easy access to what little they need by purchase from the tribes of the surrounding settlements.

While iron was introduced into Indonesia with very early impulses from mainland civilizations, pottery had been known even to primitive aboriginal tribes on all Indonesian islands since such remote periods that its absence from Polynesia makes a direct Indonesian connection with the departing Maori-Polynesian migrants out of the question.

The problem of the loom

The absence of the loom among all the historically known Maori-Polynesian tribes is another problem requiring a satisfactory explanation. Either the loom was not known in the area whence the late Maori-Polynesian ancestors came, or the technique of weaving must have been forgotten and abandoned on all the Polynesian islands, for reasons we should be able to trace.

Buck (1926 b, p. 5), in his special publication on *The Evolution of Maori Clothing*, points to the great antiquity of the period when woven textiles spread from Egypt to the Old World areas, whence Polynesia was thought to have been settled, as recently as the fifth century A.D. or thereabouts. He therefore suggests:

"...it is not unreasonable to suppose that the ancestors of the Polynesians may have been acquainted with weaving, and perhaps the loom, before they took up their residence in Polynesia. In Polynesia, however, they developed the manufacture of bark cloth [*tapa*] to such a high standard that weaving ceased to be necessary. . . . We will go a step further and say that not only could *tapa* repress weaving and prevent it being invented, but it could account for weaving being deliberately abandoned by the Polynesians if, as seems possible, the knowledge of it accompanied their early ancestors into the Pacific. Supporters of the school of continuity and diffusion of culture may regard this as an excellent example of degredation." And: "The ease of manufacture and suitability to their needs led to the high development of bark cloth that was in keeping with the higher mentality of Polynesians. A cloth was produced excellently suited to the climate, amply sufficient to protect modesty and a credit to the human vanity that seeks expression in artistic adornment. Thus they freed themselves from the drudgery of another unnecessary art, whilst their neighbours of lesser mentality remained slaves to the loom."

In a later publication Buck (1938 a, p. 47) modified this rather unorthodox evaluation of the loom, and said: "The lack of raw material in the Gilberts proved an impassable barrier to the spread of loom weaving into Polynesia." But he fails to show why the Polynesians necessarily came by way of the Gilbert Islands. And, if the Maori-Polynesians made no return-voyages to other countries *behind* the Gilberts, this is at least a proof that the all-Polynesian Hawaiki or Hawai'i must have been somewhere in the *East* Pacific, as the Gilberts mark the meeting-place of Polynesia and Micronesia.

We shall later return to the fact that linted cotton even grew wild on some Polynesian islands, without being utilized by any of the present Maori-Polynesian islanders. Even the Maori up to the time of discovery ornamented themselves with feather capes and strips of dog's skin, and dressed in their cool latitudes with finger-woven cloaks of local flax. We may note that various types of loom and true weaving were known sporadically even among the primitive inhabitants of Melanesia and North New Guinea, also in parts of Micronesia. As Indonesia gives no explanation to the loomless culture of Polynesia, we shall leave this peculiarity, like the lack of metals and pottery, an open question until later.

The wheel

The absence of wheeled traffic and transportation in the New World when discovered by Europeans has always been a favourite argument against trans-Atlantic contact between prehistoric America and the ancient Old World civilizations. Why then, should we not follow suit, and use the same argument against a trans-Pacific contact between prehistoric Polynesia and the Old World civilizations? The early Polynesians, like the ancient Americans, constructed paved roads, and transported giant timber and large stone slabs over great distances, but they were not acquainted with the wheel. In want of this simple and yet ingenious invention, they managed their overland transportation with skids, wooden rollers, or pebbles, occasionally using taro and sweet-potatoes for lubrication. (See further Part VI.)

Christian (1910, p. 246) writes: "If, as so many have confidently affirmed, and others no less strenuously have doubted, the Polynesian people in part at least are descended from a southern Asiatic stock, we should expect them to retain in their language some traces of ancient words for wheel or circle, showing that they had not wholly lost the traditions of the wheeled traffic familiar to their forefathers from Java, from Southern India, and from the shores of the Persian Gulf."

But both the wheel and the word for it are absent from Polynesia.

The first representation of a cartwheel at Ur has been dated by Woolley as about 3 200 B.C., and, according to Lewis, (1947, p. 14), Marshall attributes the first toy carts in the Indus Valley to the same approximate period. From these sources the use of the wheel spread rapidly and had even reached China by about 2 600 B.C., according to Maccurdy (1932, p. 132). The wheel spread into Indonesia with the early continental civilizations at the beginning of the Christian era, if not before.

The monetary system of the West Pacific

We have mentioned the absence of a true monetary system throughout Polynesia, including New Zealand. We shall later see how Polynesian mats of bark and vegetable fibres were treasured and occasionally used for barter, but these, being an article of utility, cannot be considered as a true currency or as evidence of any monetary system. Petri (1936) in his research into the monetary systems throughout Oceania, came to the interesting conclusion that true shell money and stone money of various types had an almost universal distribution among the more primitive inhabitants of Melanesia and Micronesia, whereas they were wholly absent from all the widespread Polynesian tribes.

The intellectually advanced Polynesians had equal access to suitable shell and stone as their alien neighbours on similar islands nearer Asia. We must therefore assume that the Pacific distribution of this basic element of trade and civilization also marks an ethnographic peculiarity which it would be wrong to regard as a coincidence. Petri, specifying the great importance throughout Micronesia of shell money, stone money, and other form of primitive but genuine currency, also shows the increasing variety of currency forms on the western islands nearest to Indonesia. He shows that the appreciation of trade and currency, even among the culturally inferior Melanesians, dated back to remote prehistoric periods, as their early ancestors had brought stone money and shell money with them when, in exceedingly remote times, they migrated from Indonesia and New Guinea to their present habitat. (See also Lewis 1929.)

Petri (1936, p. 553), referring to the stone and shell money of all the non-Polynesian islands of the Pacific, writes:

"The two earliest monetary forms of Oceania were both found in the younger stone age of Southeast Asia, and belong to the elements of that composite Austro-Asiatic-Austronesian culture which, according to Heine-Geldern, pushed forward with one branch from the south of the Malay Peninsula, across Sumatra, Java, the Smaller Sunda Islands, Southwest- and South-east Islands, and as far as to eastern Melanesia, ..."

Where this migration ends, the shell and stone money ceases, and Petri is led to the same speculation with which we are now becoming familiar. He writes (p. 551): "It is in any case surprising that the Polynesians, as the most intelligent people of the Pacific, had not arrived at a generally recognized means of barter with a fixed value, and thereby simplified their internal trade. We are in this fact apparently confronted with an example of cultural retrogression; in their Southeast Asiatic home the Polynesians were perhaps still in possession of measures of wealth, and only in their isolated island-world inside the Pacific Ocean have they in the course of centuries abandoned this element, together with the bow and pottery."

This easy way out does not seem quite convincing. Why, in the course of centuries, should this cultural retrogression only have taken place in Polynesia, when the monetary system was actively maintained throughout Melanesia, which was settled long before Polynesia, and throughout Micronesia, where the islands are as isolated from one another as are those of Polynesia? And, if the retrogression proceeded for centuries, why are there no archaeological discoveries of stone and shell money in Polynesia?

It may as well be admitted that a monetary arrangement was never part of the Polynesian social system. In other words, stone or shell money was not yet introduced as a culture element when the Polynesian ancestors left their fatherland. We have shown that this culture element is earlier in Indonesia than the local era of Yellow-brown man, as it goes back to the remote period of local Melanesian occupation. This is a further indication that the Polynesians must have separated from their remote kinsmen, the Malays, not in Indonesia, but somewhere on the early Asiatic mainland, and hence have followed a different route into the Pacific.

The absence of cement and the true arch in Polynesia

In view of the extensive stonework constructions in many parts of Polynesia—for example on Easter Island, the Marquesas, and Tongatabu—where huge slabs have been carefully tooled and laboriously made to fit each other in large walls or ecclesiastical constructions—it is noteworthy that no form of cement was known. Elaborate instances of morticing, where notches and angles were cut to match in stones quarried with neolithic tools, have impressed observers in many parts of Polynesia (Bennett 1931, p. 105; Emory 1934, p. 15; Métraux 1940, p. 290; etc.), but the use of mortar was unknown to the local masons.

St. Johnston (1921, p. 244), observing the morticing of the lintel on the titanic trilithon of Tongatabu, realized that the use of morticing instead of mortar in Polynesia "implies an early separation from the mainland of Asia, before the use of mortar was in vogue."

The same may be said of the complete ignorance of the principle of the arch and keystone in all Polynesian masonry. There were no pagodas or other elaborately roofed stone buildings in Polynesia, only some small subterranean chambers where single slabs were large enough to stretch from one vertical wall to the other. Otherwise Polynesian stone constructions consisted of raised and paved platforms, stone terraces and stepped pyramids, walls, and open stone enclosures. Both the arch and mortar were unknown also in Micronesia and Melanesia.

It would be possible to enumerate other evidence of the same category, such as the absence in Polynesia of wooden nails, rowlocks, rudders, glass beads etc., all of which had been known from very early times in Indonesia, although absent from the whole of Polynesia and most of Micronesia.

Indonesian palm-sap toddy

Another important Indonesian culture trait which is absent from Polynesia is the making of alcohol. If we are to assume that the Polynesians abandoned a previous use of iron, pottery, the loom, rowlocks, etc. as the result of degeneration, this could not be the case with alcohol, the use of which would be likely to increase with degeneration rather than diminish.

The old Indonesian process of using the coconut and other palms for brewing alcoholic beverages was, in fact, unknown in Polynesia at the time of European discovery, although it spread as rapidly as did the use of currency and iron upon first contact with European culture.

Already in the last century Colenso (1875, p. 406) insisted that the complete absence of palm wine in pre-European Polynesia was a proof that the inhabitants had not arrived from Malay territory, as any voyager from Indonesia would have brought the use of alcohol and the toddy-yielding coconut-palm along with him. In fact, the prominent botanist Seemann (1873) had by then advanced his theory of a local Polynesian origin of the coconut palm, partly because of this same ethnological observation. As Cook (1910-12, p. 317) writes:

"Seemann argued that the coconut could not have been brought to the Pacific islands from the west, because colonists from Asia would certainly have brought the Asiatic art of bleeding the sap from the palms by cutting the young flower stalks, to make toddy and sugar from the juice. Such facts tend to show that the original inhabitants of the Pacific islands did not derive their agricultural habits from Asiatic sources, and that the more modern contacts with Asia have also been very slight, since they have left the Polynesians in ignorance of the art of making toddy. . . . Had the Polynesians therefore once known the process, they would probably never have forgotten so easy a way of obtaining sugar, vinegar, yeast, and a pleasant drink, the strength of which may be regulated by time to any man's taste. So either the Polynesians could never have come from eastern Asia, or else, after spreading over the South Sea, ages must have elapsed before the cocoa-nut made its appearance in these waters, so that the process of toddy-making (there being no other suitable Polynesian palms to operate upon) had been entirely forgotten, and even disappeared from native traditions. . . . If we admit Seemann's argument, and there is no good reason for rejecting it, we can not suppose that the original settlers of the Pacific islands came from the Malay region, for the coconut is the one thing that they would have taken with them, if all else had been left behind."

We know that, when Europeans first arrived, the coconut grew right across the tropic belt of the Pacific, from the west coast of America to the east coast of Asia. The various botanical theories of the origin and dispersal of this palm will be reviewed later (Part VII); it is sufficient here to state that the coconut was part of the staple diet of the earliest Polynesian settlers. Yet even the latest immigrants were all totally ignorant of the method by which the Indonesian people procured alcoholic beverages from this and other palms.

The absence of betel chewing in Polynesia

The betel-chewing habit is another characteristic feature of Indonesia, and its distribution into the Pacific marks the route of even the most ancient migrations in these localities. As Friederici (1929, p. 462) points out, the custom of chewing betel mixed with burnt lime was of very great antiquity in the West Pacific, extending eastwards from India as far as the continental and semi-continental islands of Indonesia and Papua-Melanesia. The betel-chewing custom followed the early Melanesian migrants through Indonesia and right out to the eastern extremity of their lands, and the same habit survived when the Malays moved into Indonesia. In Micronesia the chewing of betel was limited to the Palaus and Yap and this clearly shows the extent of Indonesian influence in that area. Beyond the same southwestern corner bordering on Indonesia this ancient custom never spread in Micronesia. There was no betel-chewing among any Polynesian tribes. Melanesian travellers carried the areca nut with them, burnt their lime and carried it in especially constructed containers, but the Polynesians did not inherit this custom.

Here again is an ethnologically important culture element, very ancient among the peoples of Indonesia, carried along from island to island by Malay and Melanesian voyagers, not apt to disappear with cultural retrogression, and yet totally absent from Polynesia.

Vast gap in Indonesian-Polynesian chronology

It is, to say the least, not easy to understand how the Polynesians, with all their ancient cultural peculiarities, could have travelled from Indonesia to Polynesia in the Christian centuries, the last arrivals even in our own millennium. Polynesian race, speech, and culture-level all combine, as we have repeatedly seen, to show that a vast time-span must have elapsed since the very remote period when Polynesian and Indonesian ancestors severed their tribal contact. There is, in other words, a huge chronological gap between the ancient palæo-Polynesian departure from the culture centres of the Old World, and the sudden appearance in recent time of their Maori-Polynesian descendants in islands on the very opposite side of the ocean. This vast chronological discrepancy can be disposed of by only one plausible explanation: the Polynesian migrants might have boarded their craft in the West Pacific at a very early neolithic time, before the local introduction of metal, pottery or currency, and then have spent all the intervening period on stepping-stones en route.

If this answer is to be accepted, we have to find the possible stepping-stones.

There are two trans-Pacific routes which hypothetical Polynesian migrants could have selected on an eastward migration from the Old World to Polynesia. They could, with very little deep sea travel, have followed the ancient Melanesian trek from Indonesia by way of New Guinea, or the continent of Australia, and into the Melanesian islands. Or they could have embarked directly on an oversea voyage by pushing into Micronesia, and then travelling between the far-flung islands of this vast ocean area, until they reached Polynesia after describing a semi-circle north of Papua-Melanesian territory. In either case the obvious discrepancy in the Malayo-Polynesian chronology must be balanced by a Polynesian sojourn en route lasting from neolithic times in Asia until the comparatively recent centuries when the Polynesians occupied their present islands.

We shall consider these two migratory propositions one at a time.

The Melanesian route

Geographically speaking, the Melanesian route would be by far the most natural of the two, forming a continuous line with large islands and short waterways at least all the way from Indonesia to central Melanesia. Then the density of the islands stops, and only expert mariners could find their way thence to the lonely Polynesian groups. However, instead of offering an explanation of the missing era in Maori-Polynesian history, we find that the presence of the vast Papua-Melanesian domain represents only another obstacle to hypothetical Maori-Polynesian migrations from the west. "There exists," writes Alexander (1910–11, p. 225), "a wide gap between Polynesia and Indonesia, occupied by Papuans and Melanesians. This wide gap between the Polynesian and their congeners in the East Indies is one of the difficulties to be met with whichever theory we may adopt as to the origin of the race."

Fornander (1878), having abandoned the Malay theory in favour of Caucasians from Arabia, still had to lead his continental migrants through Indonesia if they were to reach the East Pacific. Yet he admitted: "...there is still an objection which at first sight appeared to me, and may appear to others, as an incomprehensible fact, if not a fatal demurrer to the conclusions above set forth. It is this—and the question may pertinently be asked—how came the Polynesians in their migrations, whether forcibly or voluntary, from any part of the Malay Archipelago, to push past the entire space of Papuasia—from New Guinea to the Viti group—some thousands of miles into the Pacific, before they established themselves in their new homes?"

Linton and Wingert (1946, pp. 11, 22) have tried to overcome this difficulty and explain the eastward movement right through Melanesia by suggesting that the Polynesian disappearance from the Melanesian islands was hastened by attacks of malaria. According to this theory, the Polynesians continued to push their way through inhabited Melanesia until they found rest, and no malaria, in their present habitat, the colonists whom they presumably left behind in Melanesia having succumbed to this local disease.

The weak point in this theory is obviously that the existence of malaria in Papua-Melanesia fails to explain why hypothetical Polynesians, entering this territory from the west, should feel that by moving deeper into malaria-infested territory their descendants would gradually emerge on the other side to an ocean where there were islands free from malaria. One would also suppose that Polynesians, if they had lived in Melanesia since neolithic times in Asia, would have offered sufficient resistance to the malaria to permit of their continued existence where they were.

Apart from the question *why* the Polynesians kept pushing their way straight through this era, is also the question as to *how* it could be done.

J. M. Brown (1912, p. 192) stressed: "Polynesia is in the realm of the patriarchate; the pivot of relationship is the father. Right through Melanesia and Malaysia the matriarchate is the system. ... There is no broad realm of the patriarchate westwards from Polynesia till we reach India. That the Polynesian social system should have travelled tens of thousands of miles in frail canoes in the teeth of the trade winds, and run the gauntlet of two matriarchal realms, has a touch of the miraculous in it or, in other words, seems contrary to the laws of nature." And later (1927, Vol. II, p. 149): "It is somewhat difficult to understand why a people so capable of organization, if they came from Indonesia, could have avoided bringing the idea of trade and currency that had reached into Melanesia."

It is not necessary to go over all these points again. Let us only recall that a prolonged stay in Melanesia would have brought the Polynesians into intimate contact with shell and stone money, and the chewing of betel with lime; they would have lived in the midst of people who had the loom and also pottery; and what is more, after thousands of years in Papua-Melanesia, they would have lost many of their racial characteristics, have darkened in hue instead of getting a notably fairer complexion, and have acquired the B factor which was brought by the Melanesian people from Asia.

Polynesians reached Melanesia from the east

Brown (1927, Vol. II, p. 155), in his attempt to trace a Polynesian origin to sunken lands in the Central Pacific, made at least the following interesting observation. Under the heading "Polynesianism Chiefly on East Regions of the Archipelagoes to the West", he pointed out how "the Polynesian...form of head as well as the tall form and European-like features with often a Roman or perhaps Jewish nose is to be found here and there in Melanesia and on the coast of New Guinea. But what indicates the route is that most of the Polynesianism is to be found on easterly outlines of these."

It is well known that the Fiji group was reached by Polynesian vessels arriving from the east, and more exactly from the neighbouring Samoa group, which, together with Tonga, was the centre of diffusion for Polynesian voyagers into the negroid domain to their west. Nobody would ever suggest that *Samoa* had been settled from *Fiji*, which would have been the only natural process if the Polynesians had come by way of Melanesia. The Polynesian intruders saturated all the eastern sides of the Fiji islands while they drove the Melanesian aborigines over to the west. Smaller parties reached still further west, and left some mixed Polynesian-Melanesian settlements on a number of eastern coasts and islands of the Melanesian Archipelago, which have in recent years been duly examined for indications of a possible Polynesian migration from Indonesia. Thus even Buck (1938 a, p. 17), a keen supporter of the eastward migration theory, stressed the following thought-compelling fact:

"That intermixture took place between the Melanesians and Polynesians may also be admitted, but it appears that this mixture was due to a later westward movement of Polynesians from Tonga and Samoa rather than to contact with Melanesians by the original Polynesian migrants on their way through Melanesian islands." Further (p. 41): "However, in the light of recent comparative study of the material cultures and social organizations of Melanesia and Polynesia, it seems improbable that the great migrations into the Pacific passed through Melanesia. ...

"Charles Hedley has shown that the Polynesian languages spoken in Melanesia occur on the eastern sides of the islands facing Polynesia, and further studies by G. Thilenius and S. H. Ray prove that they most strongly resemble dialects of Samoa and Tonga, the Polynesian islands nearest Melanesia. Thilenius and Ray also state that they contain no archaic words as might certainly be expected had the Polynesians passed through Melanesia on their slow progress into the open sea."

Looking for an opening for a proposed Polynesian migration from Indonesia, Weckler (1943, p. 9) also points to this important conclusion of modern research, and the consequences that logically follow:

"What used to be considered the strongest evidence that the Polynesians had passed through Melanesia is the fact that there are many small islands along the northeastern fringe of the Melanesian area between New Guinea and Fiji whose inhabitants speak Polynesian dialects, physically resemble the Polynesians more than they do the Melanesians, and have certain customs that also appear more Polynesian than Melanesian. The old accepted theory was that these were Polynesian colonies left behind by the original migrants into the eastern ocean.

"Several findings of recent years have undermined the old theory. Linguistic studies on these border islands have shown that the Polynesian dialects are spoken on the sides of the islands facing Polynesia—evidence that the language was brought by the westward movements of people from Polynesia toward Melanesia. Moreover, the speech in these border islands resembles most closely that of Tonga and Samoa, the Polynesian islands nearest Melanesia, which suggests a recent acquisition of the tongue from those nearby islands. Also, these studies have shown that there are no archaic Polynesian words in the dialects spoken on the border islands; if their speech were the lingering trace of an ancient movement of Polynesians from west to east it should contain many old words such as are found in the chants of Polynesia itself and should also show a general relationship to all Polynesian dialects rather than a specific relationship to Samoan and Tongan. Besides all this, there are very few Polynesian words that show signs of having been borrowed from Melanesian languages."

Analysing the racial elements of Melanesia, Howells (1943, p. 47) summarizes physical evidence to the same effect. He shows that Austro-Melanesia was first peopled by early primitive Australians followed by Negritos and finally by Negro peoples resembling the Congo forest stock. But there were no Polynesians among them. Nor did any of these aboriginal Austro-Melanesians push on east to discover and occupy the still uninhabited islands of Polynesia. On the contrary, when the Polynesians later arrived they entered their part of the ocean from some other direction and began to contact Melanesia from its windward side. Thus Howells (*Ibid.*) also states with regards to Melanesia: "After the settlement of Polynesia and Micronesia, there were random intrusions from these areas."

On the opposite side of Austro-Melanesian territory, in the western localities bordering on Indonesia, we find no Polynesian vestiges of any sort. Here the Indonesians appear. Krieger (1943, p. 47) writes: "The line of demarcation between Malaysian or Indonesian peoples and Melanesians is drawn between Sumba and the island of Timor in the East Indies, across Flores, and between Celebes and the Moluccas. In Timor, the Negroid and the Malaysian types meet. The Melanesians on that island are represented by both broad-headed and long-headed physical types."

Since the ancient Austro-Melanesians had established themselves in the Pacific long before the two branches of Yellow-brown man appeared in the same ocean, the foot-prints of the latter on Melanesian soil are easily distinguishable and highly suggestive: On the extreme western margin, Indonesian intruders appear, coming in from that side for a very short distance until they very rapidly disappear. On the eastern margin, Polynesian intruders appear, entering the archipelago down wind from that direction but gradually losing impetus and not leaving the slightest vestiges towards the western side. Thus, the four thousand mile wide territory of Papua-Melanesia lies between Indonesia and Polynesia as an immense buffer-state, showing some impurity only at the two extremities where its marginal tribes have mixed with the neighbouring peoples at each end.

The Micronesian route

If we now turn from Melanesia to Micronesia, we find precisely the same picture.

The four thousand mile wide oceanic territory occupied by Micronesians forms a single distinctive culture area (Murdock 1949, p. 9); but eastward, in the Marshall Islands, certain cultural similarities with Polynesia begin to appear, and these become stronger in the last sub-area, the tiny coral-atolls of the Gilbert Islands, which represent the Micronesian buffer towards Polynesia.

Correspondingly, at the opposite extremity of this vast ethnographic territory, Indonesian peoples have managed to send their impulses as far as the nearby Palau Islands and Yap, but farther into Micronesia all Indonesian elements disappear. There is a vast distance between the foremost Indonesian outpost in the west and the foremost Polynesian outpost in the east.

Polynesians, with the trade wind at their backs, have reached deeper into Micronesia from the east than have the Indonesians from the west. It is only natural that Indonesian influences should cease with the marginal Palau Group, as from here on the true oceanic territory starts, with tiny isles hidden beyond vast expanses of ocean, and with easterly trade winds dominating the sea throughout the year. The geographical location of the Palaus, the decreasing dominance of the trade winds in this Pacific corner, and the local experience of compulsory voyages (Sittig, 1895; Thilenius, 1906), all harmonize with the anthropological observation that Indonesian types, canoe-forms, house-forms, betel chewing, and pottery (Haddon and Hornell, 1936, p. 441; Friederici, 1915, p. 211) are found just here and not in other sections of Micronesia further up wind.

No Micronesian bridge towards the East Pacific

It is a common illusion to suppose that a migration into the East Pacific from Asia is an easy matter because migrants can "push on" from island to island across Micronesia. It may appear thus on a map, where names and islands are large and easy to find. But when a little craft is dancing among big seas in an open ocean where one naked horizon follows another, then the same map is less comforting, even to those who have one. The primeval Pacific voyagers had none.

The Palau are the most westerly of the Micronesian islands and of all oceanic islands in the vast Pacific. They form a compact chain of about a hundred islands located some 400 miles east of the Philippines, but less than 250 miles north of western New Guinea. From here on, a voyager to Polynesia has still another 4000 miles to cover, or almost 1/5 of the distance round the world, to reach Samoa, the nearest island in Polynesia. In this vast water-space he finds only three small volcanic islands from which to take his bearings—Truk, Ponape, and Kusaie—the rest being tiny coral atolls, rising 6—8 feet above the surface of the sea, well hidden and invisible from small craft except at very close quarters.

These atolls may readily be lighted upon by drifting voyagers and colonists from the east, but to beat up wind from Asia to look for, and find, the Caroline Islands, the Marshalls and the Gilberts is an idea too fantastic when applied to neolithic man, surpassing even the ambitions and capacity of the mediæval seafarers of the great Arab, Hindu, Chinese and European civilizations. All these lonely atolls and isles in Micronesia were discovered by post-Columbian Europeans after initial voyages from Central and South America. Before the arrival of Magellan by way of the open East Pacific, even the Chamorros of the mountainous Marianas south of Japan thought they were the only people in the world; and like the other true Micronesians they had never seen metals. (Thompson, 1945.)

There is a vast geographical difference between the semi-continental area of Indonesia and Papua-Melanesia on the one hand and Micronesia on the other. The former offered early man a land-bridge severed by short waterways, the latter a roaring ocean in the midst of which tiny low atolls were concealed. Even men of the pre-mechanical ages could move in one direction as easily as in the other so long as they travelled on land or over short stretches of water; but in the open ocean prevailing winds and currents have an overwhelming one-way influence, at least until the primitive voyager is familiar with his destinations.

The days when speculative theorists projected sunken continents up and down the Pacific basin to suit their own ideas are now almost gone; but it is no less surprising to see how even some of the competent scholars of this mechanical age are brushing aside serious practical migration problems in the Pacific, and plotting Polynesian routes merely by drawing at convenience a pencil line across the ocean.

We should not be so impressed by finding neolithic man on the true oceanic islands as to ascribe to him almost super-human navigational abilities. We should sooner look over his shoulder at the natural environment and the means of propulsion that have been at his disposal. There is a limit to the mobility of any stone age man who wants to bring his family into the unexplored oceans of the world, a limit not measurable in miles, but relative to the geographical conditions of his habitat. (Heyerdahl 1951, pp. 72, 77.)

Austro-Melanesia contra Micronesia

The fact that Indonesia and Melanesia were both peopled from the west has no bearing on the Micronesian and Polynesian problems. The geographical lay-outs were entirely different. Gregory (1927, pp. 221-226) is fully aware of the implications of this marked geological distinction upon the movements of the respective branches of mankind into the Pacific area. He writes: "In a geological sense this vast water-filled basin comprises two parts: (1) the Pacific continental border and associated continental islands; (2) oceanic islands which have no genetic relation to continental masses."

Gregory draws the demarcation line between these two parts northwards from New Zealand to the Kermadecs, Tonga, and Samoa, precisely where the ethnographic demarcation line happens to separate the Polynesians from the last outposts of the negroid Melanesians. He shows that the Austro-Asiatic continental archipelagos west of this line represent a region of general crustal unrest, and have been submerged and have emerged, been connected and disconnected, in various combinations at several periods during geological times. East of this line, however, and extending nearly to the American shores, is the true Pacific depression, where only a few peaks rise from narrow volcanic bases, at a very great depth, to terminate above sea-level as small islands. They have never been parts of the continents of Asia, Australia, and America, and have experienced relatively few changes even since past geological times. He writes:

"For the Pacific as a whole perhaps the most significant feature of land distribution is the extension of Asia south-eastward through the Malay Peninsula and on through Sumatra, Java, Celebes, Ceram, Papua—five big islands associated with many small islands in such a manner as to form nearly continuous land. And beyond Papua as far as Fiji the ocean is packed with islands. In essence this great region of Indonesia and Melanesia is a great suburb of Asia. In age and composition its rocks are those of the continent; its animals and plants predominantly are those which now live or lived on the larger land mass. ... It seems not unlikely that before the last glacial period an explorer from southeast Asia, after a succession of short trips on logs or rafts, could reach Papua and proceed thence overland to Tasmania.

"But the oceanic islands offered no facilities for migration. They mark out no route from anywhere to anywhere. They are small, wide spaced, irregularly distributed, and for plants and man to reach them involves exceptional conditions."

Returning to Melanesia he says again: "Except for short sea routes between near-lying islands, there was land to walk on and food to be had along the way. But the settlement of eastern Micronesia and of all Polynesia was quite another undertaking. The obstacles seem unsurmountable. On a possible route from the Philippines to Hawaii via Caroline and Marshall islands, the spacing of feasible landing places, roughly, is 400 miles, 300 miles, 210 miles, 60, 70, 50, 80, 120, 130, 240, 420, 110, 1900 miles. ... To reach these islands at all when the means of transport was an outrigger canoe and when even the existence of the islands was unknown seems beyond the range of human possibilities. Even for modern navigators the findings of an uncharted island in the Pacific is no slight task. Magellan (1519—20) sailed across the Pacific, finding only two little islands in a distance of 9000 miles. ... Though lying near the path of sailing ships, the most important of the Caroline Islands—Truk, Ponape, and Kusaie—probably were not visited by white men until the first quarter of the nineteenth century, 300 years after Magellan had sailed along their edge. For many islands the first landing dates from 1800 to 1860, and the first account of some islands was given to the world after 1875."

There are no "stepping-stones" of any kind inviting man to migrate from Indonesia to Polynesia along this desolate route. The Micronesian part of the ocean, equalling in size the whole North Atlantic, contains in all so few square miles of dry land that it is meaningless to judge man's hypothetical eastward urge from the local pattern of the islands. Wind and current, and not the distribution of land, influence and dominate the expansion of neolithic tribes in such an immense waste of water, where land of any description is too scarce and too well concealed from familiar waters to loom temptingly on the horizon.

We can plot migratory routes for Melanesian aborigines more or less as we will by drawing lines back and forth across their semi-continental territories. But where *terra firma* ends, the only geographical ally of a travelling neolithic tribe is a steady and dependable oversea wind. Such are the east winds of the open Pacific.

As Gregory (*Ibid.*, p. 224) states, even the elements are opposed in the Indonesian archipelago and on the islands of the open Pacific: "Over the inhabited Pacific as a whole the trade winds prevail. They characterize the climate of Polynesia, Melanesia, and Micronesia, and of two-thirds of Australia. Some islands have no other winds. Farther west in Indonesia and Southeast Asia the trades are interrupted or even replaced by monsoons."

Spirits supposed to travel west

In default of finding a natural entrance to Polynesia from the west, some defenders of the theory that the Polynesians actually came head on against the trade-winds into the Pacific, have launched a very popular and much quoted argument: that such a direction is inferred by the Polynesians themselves in describing the alleged itinerary of the spirits of the Polynesian dead. On many islands the natives believe that their departed spirits travel west. Since the ultimate destination of the disembodied Polynesian soul is the happy land of the ancestral gods, it is directly deduced that this land must have been located somewhere in the west, at the end of the spirits' journey.

This of course is an interesting chain of reasoning, an argument that should not be overlooked. Yet, as evidence of practicable human migration across the largest of the world's oceans it cannot quite compete with the grip of the trade wind, without further inquiry. As will be seen, the weakness in taking our bearings from the westbound journey of the local ghosts lies in the observation that ghosts generally travel west among aboriginal peoples, irrespective of the previous migrations of their material kin. As St. Johnston (1921, p. 29) stated in pointing out the prevalence of this religious thought in Polynesia: "This beautiful idea of the soul to the West was universally prevalent among those people who held belief in the divinity of the sun..."

There are many vestiges of former sun-descent throughout Polynesia. (See further Part X.) The first progenitor in Polynesian mythology is the bright light, the sun or the sunray, and, as elsewhere where similar beliefs prevail, the departed spirit just follows in the path of the setting sun. The sun sets beyond the western horizon, yet the Polynesians do not consider its home to be there. The real home of the sun, and abode of the ancestral sun-god Kane, is expressly stated to be in the opposite direction, beyond the *eastern* sky. (Emerson 1909, p. 258; Thrum 1929, p. 93.) This is confusing, and only makes sense when we realize that the Polynesians believed that the sun and the stars went down in the west each night, only to return to their own home in the east by way of the other side of the earth. As Buck (1932 a, p. 227) wrote in respect of a Polynesian myth connected with one of the constellations:

"According to the chant, the Pleiades represent the woman who descended into the pit of the setting sun in the west and who, after travelling around the *tua-nuku* (back of the earth), emerges again in the east scatheless after her great adventure and with her six eyes sparkling on the face of the dawn."

Ellis (1829, Vol. III, p. 170) wrote from his long sojourn among the early Polynesians: "The people imagined that it [the sun] sank every evening into the sea, and passed, during the night, by some submarine passage, from west to east, where it rose again from the sea in the morning."

Mahling (1902, p. 39) states with Gill: "The entrance to the Underworld is to be found in the west, in the opinion of the Oceanic tribes. The souls are guided to it by the setting sun, since it descends at night into the Underworld through an opening in the west and fades out, to rise again next morning into the Upper World on the other side."

Thus, a spirit which follows in the path of the sun will be sure to find the right way to the sun's own destination, the glorious abode where dwell the sun-god Kane and the Polynesian ancestors of solar descent. The westward journey of the spirit is a non-stop journey to the land of the solar gods, a religious conception, and no direction-finder to previous human settlements further west. A spirit travelling with the sun as guide will be in its eastern home before sunrise.

The Polynesian conception of "east" contra "west" is clearly embodied in their own descriptive names for these two directions. Remembering that Kane (id. Tane), the principal solar progenitor, is supposed to rule in the legendary Fatherland, and that this sacred Fatherland is even alluded to as "The Land in the Heart of Kane", it is interesting to note that "east" is referred to as "The Great Highway of Kane", "The Red Path of Kane", "The Eye of the Sun-God", whereas west was called "The Resting-Place of Kane", "The Much Travelled Highway of the Fallen One", and "The Great Path of Death". (Fornander 1878, Vol. I, p. 77; Best 1923 c, p. 106; Martin 1817, Vol. II; King 1925, p. 13.)

If we feel justified in deducing that the Polynesians must once have migrated from west to east across the Pacific because their spirits follow the setting sun, why then do we not infer the same important anthropological conclusion from other Pacific peoples who hold the same religious view?

Bastian (1883, p. 4), later quoted by Mahling (1902, p. 37), says: "On the Northwest Coast of America, as in Oceania, the disembodied souls travel to the west, following the course of the setting sun, to the Elysian islands."

Mahling (*Ibid.*) also shows with Koch that: "The aborigines of Chile place it [the destination of departing spirits] beyond the ocean, where the evening sun descends."

Does this mean that the Indians of the Pacific coast of North and South America must have necessarily migrated straight across the ocean from the west? Of course not. And if the conclusion is not of universal value, why then should it be counted on as a principal argument in Polynesian ethnology?

This frequently quoted and even more frequently misquoted doctrine has confused the migratory problem and created many imaginary obstacles to conclusions that would otherwise have been near at hand. One can find even in technical literature references to alleged Polynesian claims of a primeval pan-Polynesian homeland in the west, but in checking the source it invariably proves to be an inference from the spirit's westward journey after death. As Best (1923 b, p. 12) stresses: "Hawaiki is often confused with the spirit world itself."

Traditional migration followed the sun

It is far from my intention to belittle the value of Polynesian traditions; we should only bear in mind that the information the Polynesians have preserved about the movements of their own earthly ancestors is more dependable than their notions concerning their own ghosts, and what is more, they indicate quite another direction. The following ancient Maori chant is preserved from the early days when these roaming voyagers still knew whence their fathers had arrived (Buck 1938 a, p. 61):

> "Now do I direct the bow of my canoe
> To the opening whence arises the sun god,
> Tama-nui-te-ra, Great-son-of-the-sun.

Let me not deviate from the course
But sail direct to the land, the Homeland."

Apparently, the long journey with the sun through the Underworld was not practicable for the mortal voyager, so he was directed to take the short cut due east in an attempt to get back to the Fatherland. This piece of really practical information has been made to fit into the Asiatic theory by suggesting that the New Zealand Maori, like the Polynesian colonists in Melanesia and Micronesia, represent a "backwash" of people who had first travelled far eastwards, and then returned westwards to settle New Zealand from the east. It is argued that the Hawaiki of the Maori may be the Society Group in the East Pacific (Buck, 1938 a). But, the Maoris have traditions that go still further back in time, beyond the Hawaiki islands, to the first abode of *Irihia*, on some continental shore of the Pacific. Best (1923 c, p. 107) writes:

"We have seen that Tama nui te ra is a personified form of the sun. An old saying was, 'When Tama-nui te ra rises, the heavens are light.' When the ancestors of the Maori left the homeland of Irihia to seek a new home across the ocean, their leader said—'*Me whai tatou i a Tama nui te ra.*' ('Let us follow the sun') . . ."

This most valuable piece of traditional information cannot be fitted into the Asiatic theory, even if we resort to a vast circular migration by way of Tahiti. Best is therefore led to propose that the early Polynesian migrants, who set out to "follow the sun", must have meant to follow the *rising* sun only, as this could be interpreted as an opposite journey, from the west to the east. In this case Tama-nui-te-ra should be the name of the sun only as it rises. Best does not seem to be quite convinced by his own theory, for he writes on the very next page (*Ibid.*, p. 108): "When the Takitimu canoe sailed from Eastern Polynesia for the shores of New Zealand, their sailing instructions were, 'Carefully keep the bow of the vessel on Kopu (Venus) during the night; in the day time follow behind Tama-nui-tera.' " A journey from Eastern Polynesia to the shores of New Zealand is indeed *following* the sun and not aiming at the *rising* sun. And, as shown, the emigrants from the earliest Polynesian continental abode followed the same sailing direction. Quite obviously then, these early emigrants, who are said to have left the mainland with the determination to *follow* their solar guide Tama-nui-te-ra, must have steered their craft towards the western sky. This becomes the more apparent when the Maori, as first stated, explicitly place their Fatherland in "the opening whence *arises* the sun-god, Tama-nui-te-ra".

The information that the early discoverers set out to follow the sun is highly interesting, as this is the direction along which primitive peoples are even urged to send their own souls. We have then a religious background for the movement of man into this open sea, and, what is more, we find the original neolithic discoverers, like the later Spaniards, entering Polynesia with the strong trade wind at their backs.

Traditional migrations and historical drifts go from east to west in Polynesia

We are thus immediately on firmer ground the moment we let the spirits alone and concentrate on what the Polynesians know about their own mortal past. Nearly a hundred years ago, Ellis (1829, Vol. I, p. 126) had already collected enough Polynesian traditions to write about their early migrations: "... it is a striking fact, that every such voyage related in the account of voyagers, preserved in the traditions of the natives, or of recent occurrence, has invariably been from east to west, directly opposite to that in which it must have been, had the population been altogether derived from the Malayan Archipelago."

In more recent years Dixon (1934, p. 171) has analysed the prevailing drifts inside Polynesian territory in an effort to determine the influence of compulsory migrations on the dispersal of early man in this area. He writes: "Involuntary or storm-drift voyages have, however, often been mentioned as important factors in the spread of the Polynesian people. These refer to large voyaging canoes blown out of their course, or to smaller fishing craft carried away unexpectedly by the same agency. Since the first European contacts a considerable number of such drift voyages have been recorded. ... The greater number of all recorded drifts were from east to west, a few followed a north and south course, and only in one instance from west to east."

Historically controllable statistics thus show that drift voyages in Polynesia have had a predominant tendency to take a westward course. To fit this piece of concrete information to his belief that the Polynesians arrived from Asia, that is with an *eastward* course, Dixon is forced to the following strange conclusion to his own interesting observations: "Since the majority of drift voyages were thus from east to west, they can have played little part in the eastward spread of the Polynesian people, ..."

Why this desperate desire to bring the Polynesians in from Asia if all evidence proves to be unfavourable to such a migration? Physical anthropology does not harmonize with known facts in the West Pacific; the linguistic evidence is extremely vague and fails to give any answer; archaeology has not discovered a single certain Polynesian artifact in this region; the ethnological conditions are highly incongruent even in the broadest culture pattern; the chronology is so completely at variance that a direct migration is out of the question; the geographical separation is vast and the intermediate territory had long belonged to other neolithic branches of mankind; the prevailing elements are contrary; and mythology, legends, and historical drift voyages all offer similar obstacles to the supposed migration into Polynesia from the west. Yet this battered old hypothesis has never been abandoned because its tenability has been taken for granted and it has thus never had to stand a test.

The importance of Fiji in Polynesian material culture

Before we return once more to the last loop-hole for an eastward Polynesian migration, Micronesia, we shall consider also the last of the data that have been mustered in support of a Polynesian origin *behind* their present neighbours to the west.

We have mentioned the marginal influence of Polynesian voyagers and colonists on the eastermost islands of Micronesia and Melanesia. Nearest of all these foreign lands to Polynesia are the Fiji Islands of Melanesia. These islands are not only the nearest, but also the largest and richest of all those directly adjoining the Polynesian habitat. It is only natural, therefore, that Fiji should be the principal centre for all Polynesian external trade and activity. (Buck 1938 a.)

In Fiji, the Polynesians had full access to certain material goods unknown on their own oceanic groups, and some of these possessions spread into Polynesia by barter. Since these elements as such extend from Melanesian territory right back through the Malay domain to the coasts of Asia, they have so often been used as proofs of an Indonesian-Polynesian migration that it will be necessary here to see how valuable they are as arguments of human relationship. The objects in question are the domesticated pig, the dog, the fowl, a certain number of the cultivated plants, and the outrigger.

Buck (1938 a, p. 311) writes: "The importance of Fiji as a trade center cannot be overestimated. The western triangle of Samoa, Tonga and Fiji became an important area for exchange and diffusion. Commercial relationships were favored by intermarriage, and Fijian customs that were of use to the Polynesians were readily adopted. Intermixture took place between chiefly families, and as a result a higher Fijian culture that absorbed certain Polynesian elements was developed at the places of contact. ... The cultural changes that took place in the western triangle were initiated primarily by exchange and barter for food plants and domesticated animals. ...The plants and animals were carried to central Polynesia, but the Fijian customs remained in the west."

Melanesian food plants fetched by Polynesians

Buck, while a noted supporter of the eastward migrations theory, rejects the tenability of early Polynesian voyages by way of the Melanesian route, showing how modern research speaks firmly against such a possibility. (Buck 1938 a, pp. 41, 42; 1945, p. 12.) In defense of the second alternative, a migration by way of the Micronesian domain, he argues (1938 a, p. 45): "Strong support in favor of the Micronesian route lies in the positive evidence against the route through Melanesia."

Not accepting this conclusion as exclusively in favour of Micronesia, we may still admit that the moment we discard Melanesia as a stepping-stone for Polynesian migrants, we automatically deprive ourselves of any further support in the aforesaid cultivated plants. This important fact was first realized and pointed out by Buck himself (1938 a, pp. 307, 309), who showed that the dry and sandy soil on the low atolls, to be encountered on the route through Micronesia, was not suitable for the cultivation and spreading of the food plants in question. He states:

"The Micronesian route, therefore, could not have been taken by the plants...though the Polynesians travelled into central Polynesia by the Micronesian route, such important food plants as the breadfruit, banana, yam, and finer taro were carried from Indonesia to New Guinea and relayed by Melanesians to their eastern outpost at Fiji."

Melanesian hog and chicken fetched by Polynesians

Having shown that Samoans and Tongans visited Fiji from the east and thus acquired these food-plants through secondary contact in the recent period at the peak of Polynesian seamanship and inter-island navigation, Buck goes on to show how the spread of the domesticated animals was closely associated with the spread of the food plants. The domesticated animals of Polynesia, all of which were imported to the islands by man, were the pig, the dog, and the fowl.

He stresses (1938 a, p. 310): "It is significant that none of these three animals was found on coral atolls in Polynesia when first visited by Europeans." Showing the apparent reason to be the inadequate supply of food on sandy atolls, he pointed again to Micronesia: "Coral atolls thus formed a barrier to the spread of domesticated animals. They must have been relayed along the Melanesian route and passed from Fiji to Samoa."

What was stated in regard to the food plants is valid also as affecting the spread of the said animals. Thus, it is rash to say that we have proof of Polynesian migration from Indonesia in the existence of these common plants and animals. We have no evidence that either was taken out of Indonesia by Polynesians. As Buck (1945, p. 13) admits: "However, food plants and animals from the Indo-Malayan area reached Fiji through the Melanesian chain, and they could have been relayed later into central Polynesia through Samoa, even though the main human movement had not flowed that way."

Obviously, the Melanesians alone were responsible for relaying their own domesticated animals and plants eastwards through their own islands as far as to Fiji. The Polynesians cannot have carried the breadfruit, banana, poultry, and pigs from Indonesia to the nearest land in Papua-Melanesia, and then have sailed all the way around from atoll to atoll in Micronesia to discover Samoa, and then gone back west to pick up this valuable property, which in the meantime had been conveniently relayed by Melanesians as far as to Fiji. The presence of this material property, even in parts of Papua-Melanesia where Polynesian colonists can never have been, and the absence of facilities for their spread through the Micronesian atolls, which have been proposed as marking the route of the protracted Polynesian migration, provide double evidence that the Melanesians and not the Polynesians brought these elements on their original journey into the East Pacific. So they have no value as proof of a Polynesian origin in Indonesia, as they tell us nothing but what we know already—that Melanesia itself represents a direct extension of the Indonesian archipelago, and that Melanesians had marginal contact with Polynesians on the opposite side.

Weckler (1943, p. 20), trying to bring the Polynesians east by way of the Micronesian ocean, dwells on the same important point. He writes: "Such were the islands the Polynesians encountered when they pushed into eastern Micronesia. In this environment none of the food plants they had brought with them from Indonesia could grow except the coconut and a coarse variety of taro. Nor was there food to keep their domestic animals alive. The twin staffs of life during this period became the coconut and sea food."

The fact that the coconut remains as the only important food-plant that willingly grew on coral atolls is not very encouraging for the upholders of the Malay-Polynesian theory, as we have shown how the coconut happens to be just the one plant that must have been missing in the migratory period, if the absence in Polynesia of the Indonesian custom of brewing palmwine is to be explained.

Polynesian dog unidentified

As to the animals, we shall see later (Part VII) that the now extinct Polynesian dog, *Canis Maori*, is useless as argument even for *Melanesian* contact, since it has never been identified with any known breed west of Polynesia, and shows as much similarity to the mummyfied

Peruvian *Canis Ingae pecuarius* in the east as to the Australian dingo or Indonesian paria-dog in the west, if not more. None of the three domesticated animals of Polynesia were universally or evenly distributed even on all the volcanic islands. Domesticated animals were generally found here and there as the local mariners had been able to secure the respective species. For instance, Tongatabu and the Marquesas Islands lacked the dog, Mangaia and Easter Island lacked both the hog and the dog, New Zealand lacked the hog and the fowl, and the Chatham Islands had none of the three animals.

The arrival of the pig

That the Polynesian pig originally came from Melanesia is obvious, as it does not differ from the *Sus papuensis* which was widespread all over New Guinea and Melanesia long before the Europeans arrived. That it actually entered Polynesia through marginal contact between Samoa and Fiji is definitely stated in a Samoan tradition (Buck 1938 a, p. 310), informing us that a Samoan voyager visited the Fiji Islands and brought some young pigs back with him to his own community, "...and so pigs were introduced to Samoa."

Further out, the Tahitians tell us that when their ancestors settled the islands no man had ever seen a pig or a chicken. But in later generations the son of a chief of Raiatea, referred to as Metua-puaa, or "Pig-parent", went to Bora-Bora, one of the Society Islands nearest Samoa, and hence he procured the first pigs known to the Society islanders. "... and his wife and all her family were delighted with the new animals, never suspecting whence they had sprung. From that litter were propagated all other pigs upon this earth, and they became good food for gods and men." (Henry 1928, p. 381.)

In this way the pig spread through inter-island trade. In the Society Islands the pig was accessible to visiting mariners from the more easterly Polynesian islands. The Easter Islanders and the Tuamotu population never acquired the pig, but Porter (1815, Vol. II, p. 52) wrote from his early visit to the Marquesas group: "According to the traditions of the natives, more than twenty generations ago, a god named Haii visited all the islands of the group, and brought with him hogs and fowls, which he left among them." This means that, according to the historical traditions of these islanders, the pig and fowl did not accompany their early ancestors on their primary migrations, but were secured from a subsequent visitor whose voyage took him to the Marquesas about the beginning of the 14th century, that is in the same classic period of inter-island contact and exchange as already referred to.

We may even be able to gain valuable information from the absence of pigs and fowls among all the early immigrants of New Zealand. We know from traditional evidence that the Maori, after settling New Zealand, only maintained contact with their relatives in Eastern Polynesia for a comparatively short period. Then they severed relations with the outside world and thus remained in almost complete isolation until Tasman arrived as the first European in 1642. In this way we know that the New Zealand Maori remained unaffected by many impulses that later were spread through the islands of Central and Eastern Polynesia by local Polynesian conquerors, refugees and traders. We may presume that if pigs and chickens had existed in Eastern and Central Polynesia at the time of the Maori voyages, either or both of these would have been brought to New Zealand, together with the edible Maori dog, in one of the many decked double canoes. By such craft the pig and the dog were carried to Hawaii. But the strange fact that no Maori craft brought pigs and fowls along seem to indicate that these immigrants had not touched at islands where they had been introduced. This supposition may be strengthened by the fact pointed out by Best (1923 a, p. 33), that: "There is a curious absence of mention of the pig in Maori tradition."

The same may be said about the fowl, but not about the dog. As Colenso (1877, p. 152) says: "The dog is mentioned in their oldest traditions and myths." Indeed it figures in the myths of Maui and the earliest discoverers who set out from the Fatherland. (*Ibid.*, p. 154.)

Melanesian origin of the Polynesian outrigger

In this connection we may note another important peculiarity in aboriginal Maori culture. When Tasman and the earliest European ships reached New Zealand from Polynesia, the outrigger was still as unknown to the Maori as was the hog and the chicken. (Mead 1928.) At that time the outrigger was in common use throughout Polynesia, except in the Chatham Islands (where there were only raft-boats), in the Gambier Islands (where the first European visitor only observed sailing log-rafts), and throughout New Zealand (where there were only double and single canoes, log-rafts, and reedboats).

If the outrigger, which became so popular among the Maoris' kinsmen abroad, had been in use among the Maori ancestors or even in central Polynesia when the Maori passed through, it would not have been overlooked by all the New Zealand tribes. It has, therefore, often been suggested that the Maori ancestors had not discarded the outrigger, but that they had all arrived without it, as the Maori traditions emphasize—in large double canoes. This observation has quite logically sponsored the theory that originally the outrigger boom was not in use on the craft that brought the Polynesian voyagers into the East Pacific.

As Weckler (1943, p. 11) says: "We cannot know, with certainty, what the ships were like in which the Polynesians first started out from their Indonesian home."

Yet we can fairly well guess that, if the Polynesians had started from Indonesia in craft carrying outriggers, these outriggers should be Indonesian in design; but, if they had no outriggers until they settled the East Pacific, then their outrigger would be a secondary acquisition from Fiji, and accordingly Melanesian in design.

The principal difference in the distribution of outrigger types in Indonesia and Melanesia is quite apparent, and it is equally evident which of the two designs the Polynesians have followed. All through Indonesia, from Sumatra, Java, Borneo, the Philippines, and Celebes, and continuously east as far as to the nearest tip of New Guinea, the Malays and Indonesians have since early times used the double outrigger, a hull with a buoyant boom on each side. Such were the outriggers seen in the sculptures of Boro Budur in Java from the eight or ninth century, and such were, according to Vroklage (1936, p. 757), the outriggers used on local proas in Southeast Asia since the second millennium B.C. The single outrigger, with a buoyant boom only on one side, is quite exceptional in Indonesia. (Haddon and Hornell 1938, pp. 15, 16.)

The double outrigger is also used by certain Australian aborigines, but as Hornell (1943,

p. 99) points out, it is absent from "the whole of Melanesia except in the extreme western fringe where it marches with Indonesia."

As the limit of the double outrigger runs between Indonesia and Papua-Melanesia, it is highly significant to note that the Polynesians do not break the uniformity of this picture. The double outrigger canoe of Indonesia was not used by any islanders in the whole of Polynesia and Micronesia. It is very noteworthy that this form of outrigger, which had spread from Indonesia sporadically along the coast of Asia even as far as to Madagascar, had not been carried to any of the oceanic islands. Whether the canoe was large or small, whether used on the high seas or in the lagoon, the Polynesians, whenever they used the outrigger, attached a single boom to one side of the hull in Melanesian fashion.

Nor did the Polynesian ancestors enter the ocean with knowledge of the rudder. Yet vessels with the true quarter rudder are depicted on the Indonesian bronze drums from the earliest Christian centuries. The geographical limit of Indonesian ideas in Oceanic boat design is easily distinguished, as it is seen in the same south-western corner of Micronesia, represented by the Palau Islands, whence some ideas, like the true quarter rudder, have spread to the Carolines.

Hornell (Haddon and H. 1936, p. 441) states: "The Palau canoe type, as may be expected from the proximity of the islands to the Philippines and the Moluccas, is the only one with affinity to any present-day Indonesian type, though this is revealed only by the shape and length of the *bagad* bars, a form of thwart with carved ends projecting outboard on both sides and by a stringer (goreal) connecting their ends on the lee side. In Müller's opinion the presence of these features links this design with those of the southern Philippines and Sangir Islands. In common with Indonesian canoe design, but alone among Micronesian sailing canoes, those of Palau have the sides of the hulls bilaterally symmetric."

We shall return to the deep sea Maori-Polynesian canoe in the next chapter; here its only purpose is to show that the Maori isolated themselves in New Zealand before the outrigger had become a generally adopted attachment on Polynesian canoes. The outrigger which later spread among the Polynesians was not the double outrigger of Indonesia, but the type which had been observed during voyages to Fiji. We have thus no reason to conclude that the outrigger attachment spread directly from Indonesia to Polynesia, but should instead realise that the easily acquired idea of a balanced canoe spread from the same Melanesian source that gave the Polynesians the pig and the fowl, after the Maori separation.

A useful idea may spread beyond human relationship. We should get strange physical patterns if we were to assume that all people using outriggers descended from the same stock, or that all people keeping dogs, pigs, and chickens, or eating bananas, were of the same kin. We do not deduce that the Polynesians are Melanesians because they use the Melanesian single outrigger or breed the same pig as these neighbouring tribes; why then should these arguments be valid as a proof of relationship between Polynesians and Indonesians?

Other reasons for suspecting Polynesian origins in Indonesia

It may perhaps be interesting to enumerate the current arguments for a Polynesian migration from Indonesia. This was done by Weckler in support of the Indonesian theory in 1943, and one may assume that arguments known neither to him nor to the present author cannot have been strong enough to leave a lasting impression upon the Polynesian literature as proof of Polynesian origins in that archipelago.

Weckler (1943) enumerates the following points:

The Polynesian reference to an ancestral island which they name Hawa-iki, which might be a reference to Java or some nearby island that might have been called Java then.

The common use of the outrigger.

The growing in both territories of banana, coconut, breadfruit, taro, yam, and sugarcane.

The custom in both areas of keeping domesticated dogs, pigs, and chickens.

The source-relationship in language.

Strong similarity in the bark-cloth manufacture of the interior of Celebes and Polynesia.

The existence in many parts of Malaysia of the Polynesian method of making fire by rubbing the end of one piece of wood along the grain of another.

As will be seen, Weckler's list includes two points which have not already been dealt with on the previous pages. These are the Polynesian-like manufacture of *tapa*, or barkcloth, in the interior of Celebes, and the common Malay and Polynesian method of kindling fire.

Both of these arguments however, belong to a doubtful class of evidence, which includes a number of other cultural elements that have occasionally been mustered to argue blood relationship between Polynesia and the Malay domain. They are doubtful as arguments only because they are shared as well by Yellow-brown peoples on the opposite side of Polynesia, in the New World.

Thus the fire-making method of Polynesia is duplicated in detail among widespread American Indians (Jenness 1932, p. 29 fig. b); and the bark-cloth industry is found sporadically on the Pacific slopes of the New World, from British Columbia in the north (Goddard 1924) to the prehistoric kitchen-middens of Peru in the south (Bennett and Bird 1949).

The obvious similarity between the bark-cloth and mallet of Mexico and Celebes may be judged from the illustrations in Plate I, which are enough to show that this art need not necessarily have entered Polynesia from Celebes. Like the method of rubbing fire, it could have entered the Pacific from either side. In any case, the theory that the particular bark-cloth industry of the Celebes interior spread east to Polynesia is entirely inconsistent with the view that the Polynesians spent a long time in Micronesia on their passage eastward. On the Micronesian atolls, the past and present inhabitants have been unable to secure the necessary raw materials for the beating of bark-cloth (Ball 1929, p. 44), and for this reason Micronesia is recognized as a barrier to the spread of this ancient custom of Yellow-brown man. Weckler (1943, p. 23) realizes this difficulty himself, as he states:

"The theory of a long stop in eastern Micronesia with the consequent loss of arts such as the making of bark cloth does not accord with the evidence cited earlier of the relationship between the *tapa* industry of the island of Celebes and that of Polynesia. For if the Polynesians had lost the *tapa*-making art and relearned it from the Melanesian Fijians, the second learning would have been new to the generation that reacquired the art and they would doubtless have taken over Fijian techniques and terminology. This bit of evidence argues, therefore, that the Polynesians passed rather quickly through the area where the raw materials of barkcloth making would not grow. But no one piece of evidence is conclusive and there is not a preponderance one way or another on this matter so far."

However, we cannot very well expect to benefit from both alternatives by refusing to reject either. We must either abandon the argument of a possible diffusion of the barkcloth industry from Indonesia to Polynesia, or else abide by the hypothesis that the Polynesians passed quickly through Micronesia, in which latter case the vast chronological discrepancy is still unaccounted for.

Weckler himself seems to prefer the lesser of the two difficulties, and to benefit from the chronological gap, as he writes (*Ibid.*, p. 21) about the hypothetical Polynesian sojourn in Micronesia:

"But the limitations of this environment probably forced the Polynesians to give up many of their old skills if they stayed long in eastern Micronesia. This probability increases our difficulties in trying to trace the Polynesian ancestors back to any particular place and time in Indonesia, for many clues may have been lost through the cultural specialization involved in eking out a living on coral atolls."

Polynesians reached Micronesia from the East

Is there really any reason for assuming a Polynesian passage through Micronesia at all?

Weckler writes further (*Ibid.*, p. 10): "As one of the leading ethnologists of Polynesia, Peter H. Buck, says in 'Vikings of the Sunrise': 'Strong support in favor of the Micronesian route lies in the positive evidence against the route through Melanesia.' The fact is that, unfortunately for students of Polynesian history, the resemblances between Micronesia and Polynesia are not much greater than those between the latter and Melanesia. Some scholars account for this by arguing that Mongoloid peoples similar to those who crowded into Indonesia behind the Polynesians followed them into Micronesia and took their places when the Polynesians moved into the eastern seas."

In this way one purely hypothetical theory is launched with no other motive than to account for the deficiency in another. In reality we have no reason whatsoever to assume an early Polynesian migration through Micronesia. There are no kitchen-middens or archaeological sites marking a Maori-Polynesian layer or evolutionary centre in Micronesia, and the great majority of the isles encountered en route are barren atolls with no humus to hide great secrets of the past.

The absence of any indication of a Polynesian passage through Micronesia was openly admitted and agreed upon at the last Pacific Science Congress which was held in New Zealand in 1949. Murdock (1949, p. 9) opened with a review of the latest data on "Cultural Sub-areas in Micronesia", showing that Micronesia formed a single distinctive culture area, within which 15 sub-areas could be distinguished. He showed that only one of these—the corall atolls of Kapingamarangi and Nukuro, north of Melanesia—"is Polynesian in culture. The other 14 reveal, by contrast, a fundamental unity in culture and social structure."

In the discussion that followed after this lecture (*Ibid.*) Buck asked Dr. Murdock "if he considered that the Malayo-Polynesian people passed through Micronesia, to which Dr. Murdock replied that details of technique and available physical evidence seem to show Polynesian culture did not develop out of Micronesian. Polynesian social organization is closer to that of Indonesia than Micronesia or Melanesia."

The next paper, read by Dr. H. L. Shapiro on the "Physical Anthropology of Micronesia", showed that this field also revealed no evidence of a Polynesian passage through Micronesia. The discussion that followed,—like the conclusion of recent research in Melanesia—show that all Polynesian influence in Micronesia was due to colonists from Samoa and Tonga, a movement in the opposite direction from what it should have been had the Polynesians come from the west. Even Buck, who had gained his support for the Micronesian route just from this positive evidence against Melanesia, was now obliged to admit that Polynesian settlements in Micronesia did not support his view that the Polynesians had passed through that region from Indonesia. He admitted that he had been under the impression that the Polynesian influence on the two Micronesian atolls of Kapingamarangi and Nukuoro[1], taken in conjunction with certain similarly affected Melanesian islands directly south of them, represented the trail of the Polynesians into the Pacific; and said "it now seems that these Polynesian groups may be a backward movement which started from Samoa and Tonga and lost impetus after a certain distance." (*Ibid.*)

Later in the Congress, when Shapiro dealt with the anthropological value of blood groups, he said in reply to a new question from Buck: "The presence of B in western Polynesia seems to be the result of contact with Micronesia and Melanesia." Further: "He [Shapiro] agreed with Sir Peter Buck that the lack of B in Polynesia would mean that, if the Polynesians came through Micronesia, they came before the Micronesians had settled there, though Dr. Murdock mentioned the possibility of a rapid passage through Micronesia by the Polynesians even after Micronesian occupation." (Shapiro 1949, p. 25.)

There is only this to be said: if the Polynesians passed rapidly through Micronesia to avoid acquiring the B factor, where did they come from? Certainly not from Indonesia, India, or China, where the B was as high as in Micronesia, or higher. If the Polynesians passed rapidly through Micronesia, how was it done in practice? And how could the Micronesians leave Eastern Asia with B when the Polynesians left afterwards without it? On the other hand, if the Polynesians passed through before the Micronesians arrived, our chronology becomes worse than ever, for the Micronesians themselves had arrived as a neolithic people.

It is sufficiently apparent that all attempts so far to bring the Polynesians in by way of Melanesia or Micronesia have been a matter of mere guesswork. Inconsistent theories have been advanced, amended, and replaced, not in an attempt to interpret available evidence, but with the preconceived intention of figuring out a possible way of letting Polynesian aborigines in through ethnographic territories which from all angles prove to constitute not stepping-stones, but effective barriers. Openings are sought for where no natural openings are found, and solely in default of other clear alternatives.

The question remains whether we have not been knocking on the back door of Polynesia in trying to beat our way through Melanesia and Micronesia with an aboriginal people who had themselves perhaps found another and easier front entrance to their island domain. A glance at a Pacific map will at least tell us that in focusing all attention to Asia, we have overlooked no less than half of the territories which share frontiers with Polynesia, and which has a direct access to the Pacific Ocean. America too may offer us stepping-stones from neolithic Asia into recent Polynesia.

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[1] Loom weaving was known in Nukuoro and Kapingamarangi. (Buck 1950, p. 148.)

PART II

POLYNESIA
AND NORTHWEST AMERICA

POLYNESIA AND NORTHWEST AMERICA

When early East Asiatic man met the sea, he behaved like any other mammal. Where land ended, he was led to follow the shoreline, up or down. Up meant America, down meant the Malay Peninsula.

The same spreading movement up and down this coast was probably followed by several breeds of mankind throughout the long, dim past of the human race. By bending off along the coast, even early hunters and collectors were probably led north into the New World and south into Austronesia in periods when both these territories were accessible to coastal migrants in a different way from today.

As culture increased and primitive man acquired a buoyant craft, new explorers were enabled to resume the same coastal trek, even though land or ice were now less continuous in some areas. Unfamiliar lands with further hunting-grounds tempted them across channels and straits, and where islands were close enough to form a chain, the new migrants spread from one coast to the next that was visible against the sky. Thus Yellow-brown man followed in his craft the early movement of black-skinned aboriginals into the island-studded sea of Indonesia; and thus the same Yellow-brown race, in the far north, was successful in finding the only natural access to the New World from the west.

Like previous observers, we have said that there is only one truly semi-continental island route that can carry Asiatic man on a natural eastward movement for some distance into the Pacific; namely the Papua-Melanesian island bridge. This statement, though true, requires modification. There is indeed another island-studded route which can carry man much further east, in fact right to the far side of the ocean, with very little water to cover. This route is in the extreme north, across the narrow Behring Strait, or along the Aleutian chain of islands, into America.

When the sea is calm the narrow Behring Strait can be crossed by the smallest craft, and in cold winters even on foot on the ice. This passage is considered by most Americanists to represent the principal gateway of Asiatic man into the New World. More recently attention has also been focused on the alternative and possibly subsidiary entrance route a thousand miles further south—the Aleutians. In the narrowest corner of the vast Pacific, and on the northern latitudes of London, Liverpool, and Glasgow, the Aleutian island ridge spans the gap between the continents that form the ocean's boundaries. And near these high latitudes a strong and warm ocean current flows directly from the Old World to the New. This current brings tropical water up in a swift stream, flowing directly from the Philippine Sea past the coasts of Japan and into the ocean off the island-studded Northwest American coast. Thus the Philippine water is still so warm when it reaches these high latitudes of Pacific America, that it provides the local Northwest Coast Indians of the British Columbian archipelago with a climate that is temperate throughout the year.

The Northwest Coast Archipelago as stepping stone for Asiatic migrants into the East Pacific

The distance from the Philippines to the nearest point in Northwest America happens to be the same as from the Philippines to the nearest point in Polynesia.[1] But whereas the metric distances are equal, the guiding influence of nature upon the migration of primitive man is otherwise. The elements encourage a voyage from the Philippine Sea to Northwest America in the same degree as they impede a voyage from the same Indonesian source to Polynesia. Once man has reached the coastline of America, the current turns to afford him access to invisible islands in the open Pacific beyond. And we may well bear in mind that if an overland migration by neolithic man requires generations or centuries of gradual progress, a corresponding distance may be covered by the same tribe in a matter of weeks on a drift voyage sponsored by prevailing elements at sea.

As a third alternative, could the Northwest American route be feasible as a road to Polynesia, instead of the Papua-Melanesian island bridge or the open Micronesian ocean?

Could the neolithic ancestors of the recent Maori-Polynesian seafarers have dwelt, without metal, pottery, loom, or monetary system, somewhere along this northern Asiatic-American route, to push down upon Hawaii at the beginning of our millenium?

That this possibility is at least worthy of examination is apparent for two major reasons. Firstly, because—until the problem is otherwise solved—we should be very cautious about rejecting any alternative unexamined. Secondly, because we know that the same race which sent a Yellow-brown branch into Indonesia sent its relatives across the Behring Strait or the Aleutians into the New World.

The American branch of the Yellow-brown race

America too, as much as Indonesia, and far more than New Guinea and Melanesia, has thus been trodden be migrants of that early Yellow-brown race to which even Polynesians and Micronesians seem to stand in a certain distant relationship.

It is this people Taylor (1923, p. 255) describes when he says they "followed the old corridor across the Behring 'isthmus', and so populated America. No doubt some of the earlier Amerinds had reached the new world before, but the later and higher types of Amerind are so closely akin to the Polynesians and Indonesians that we may safely deduce a common period of migration from their old homelands in the interior of Asia."

Sullivan (1922, p. 258), in his attempt to put the Polynesian tribes in their proper place among the Yellow-brown peoples, found that there was a fairly well-marked line of cleavage between two subdivisions of the now known Yellow-brown peoples. One sub-division included the Chinese, the Japanese, the Koreans, the numerous Siberian peoples, and many other Asiatic groups. The other included the American Indians, the Malays, the Indonesians, and, with somewhat more uncertainty, the unidentified Polynesians. Sullivan adds (*Ibid.*, p. 260) about the latter island tribes:

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[1] All comparative measures given in this work should be checked on a *globe*, which, in contrast to any map, gives correct proportions in all latitudes. Exceedingly few observers seem to realize the essential geographical fact that, due to the curving of the earth's surface, the distance in actual miles from Indo-China to South America is no shorter in a "straight line" across the open equatorial Pacific than by way of the Aleutian islands and the far North Pacific.

"At present I would not care to do more than to express a belief that the relationship existing between the Polynesians and the American Indians is considerably closer than that existing between either the Polynesians or the American Indians and the Chinese."

In a later publication, however, Sullivan discussed the principal physical characters of a dominant Polynesian type, in an effort to determine whether it approached the Mongoloid form or whether it was closer to our own Caucasoid race. He says (1923, p. 227):

"Of the 23 characters discussed two are pretty close to the Caucasoid norm and more are closer to the Caucasoid than to the Mongoloid norm. ... In brief, the evidence seems to be fairly evenly balanced and points to a type intermediate between the Caucasians and the Mongols. If anything, the evidence rather favors a closer Caucasian relationship. Our decision hinges somewhat upon the classification of certain doubtful Asiatic and American types. If we are to accept all of the American Indians as Mongoloid, there would be little difficulty in classifying the Polynesians also as Mongoloid.

"It is certainly true that superficially the bulk of the evidence indicates that the Polynesian is slightly closer to the generally accepted Caucasoid norms than to the generally accepted Mongoloid norms. The burden of proof falls upon those who defend a theory of a Mongoloid origin of the Polynesians. Such a point of view is only possible on the assumption that the Caucasians and the Mongoloid stocks are very closely related and that the primitive Mongoloid stock gave rise to the Caucasian stem. It was upon such a basis that Boas defended the Mongoloid origin of all the American Indians. ... If then the Polynesian is not to be regarded as a true Caucasian, he is to be regarded as at least a decided step in that direction. The Polynesian, Aino, and certain American Indians may egotistically be looked upon as unsuccessful attempts of nature to make a Caucasian."

The essence of this discussion is that among all Yellow-brown peoples, Sullivan found the Polynesians to be most closely related to the inhabitants of Indonesia and America. Furthermore, of the latter two groups, the Polynesian type is nearest the American, as the American, like the Aino and the Polynesian, all seem to represent an intermediate form between the Mongoloid and Caucasoid norm.

Sullivan (*Ibid.*, p. 229), within the same Polynesian island habitat, found another Polynesian type with less marked divergence from the Indonesian. But even concerning this type he added:

"It does, however, depart radically from the ordinary conception of the Indonesian in two traits: stature and cephalic index. ... Due no doubt to the absence of better data from Indonesia some of the closest parallels are in certain divergent American Indian groups with low faces and broad noses."

The disputed interpretations of American-Polynesian affinities

Having thus demonstrated how both his Polynesian types are closely linked up with the physical characters of certain American Indian groups, Sullivan refrains from any further discussion or conclusion, because, as he said, he judged it to be "unlikely" that *America* could have contributed to the direct settlement of distant Polynesia. Sullivan's hesitancy in following up his own discovery of a close American-Polynesian convergence in physical traits, reminds us of Dixon's hesitancy in drawing any practical conclusion from his own observation that the bulk of historical drifts in Polynesia are known to have been from east to west.

We here come up against a psychological barrier to all further discussion of American-Polynesian relations, a barrier which is so apparent, and so ever-present in Polynesian literature, that it will be necessary to discuss its cause and value before we can proceed to include America in a study of Polynesian affairs.

The existence in Polynesia of various racial and cultural elements found to be characteristic also of the aborigines of prehistoric America has frequently been pointed out by previous observers.[1]

Some of the less impressive arguments thus presented may perhaps be based on casual similarities due simply to independent evolution along parallel lines. Others, as was the case also with some Malay-Polynesian parallels, may be the result only of a common source inheritance from the early Yellow-brown man of Asia.

Yet there remains a vast array of evidence which cannot be explained except by a mutual coast to coast contact between America and Polynesia. This has been realized and emphasized by the great majority of the authors listed in the footnote belove. Even so, none have made a serious attempt to take up the question of American-Polynesian relations in its full width.

That such an inquiry might yield interesting results has been realized by many. Friederici (1915) speaks of "the exceedingly great number of ethnological parallels that exists between America and the Pacific Islands which have not yet been adequately dealt with".

Wissler (1917, p. 356) refuses to accept the theories of trans-oceanic migrations from any part of the Old World to America, but states: "Most of these writings are merely speculative and may be ignored, but some of the facts we have cited for correspondences to Pacific Island culture have not been satisfactorily explained."

Jenness (1932), although objecting to a Polynesian intrusion into America, says: "We must frankly admit, however, that certain analogies between the two regions are too

[1] A brief survey of the literature on the subject will show that such arguments have been launched by Aichel (1925, p. 269), Allen (1884 p. 251), Andersen (1934, p. 264), Barbeau (1929), Best (1925), Bingham (1948, p. 15), Boas (1925, p. 28), Brown, F. B. H. (1931, p. 138; 1935, p. 190), Brown, J. M. (1924; 1927), Bryan (1935, p. 67), Buck (1938 a, p. 314), Campbell (1897–98), Carter (1950), Christian (1924, p. 535), Cook, J. (1784, Vol. II, p. 280, 324, 373), Cook, O. F. (1901; 1903; 1910–12; 1918), Davidson (1935), Degener (1949, p. 195), Dixon, G. (1789, p. 205, 244), Dixon, R. (1932; 1933; 1934, p. 175), Ellis (1829, Vol. I p. 122, Vol. IV p. 433), Emory (1928, p. 112; 1933; p. 47; 1942 b), Fedde (1909, p. 280), Friederici (1907; 1914; 1929), Garnier (1870), Gudger (1927), Handy (1930 b, p. 104; 1931, p. 104), Heine-Geldern (1938; 1950), Heyerdahl (1941 b; 1950; 1951), Hill-Tout (1898), Holmes (1919, p. 29), Hornell (1931; 1945; 1946 a), Hutchinson, Silow and Stephens (1947, p. 79), Hutchinson T. J. (1875, p. 442), Imbelloni (1926; 1928 a; 1928 b; 1930), Jacobsen (1891), Jakeman (1950, p. 32), Jenness (1932), Lewis (1947), Luomala (1940), MacLeod (1929, p. 425), Merrill (1939, p. 637; 1946, p. 344), Moeller (1937), Moerenhout (1837, Vol. II, p. 244), Moreno (1901, p. 576), Niblack (1888), Nordenskiöld (1931), Olson (1927–29), Perry (1923, p. 229), Posnansky (1914, p. 13), Rivet (1926, p. 143; 1928, p. 583; 1932; 1943), Roberts (1926, p. 341), Schurtz (1895), Shapiro (1940 a, p. 416), Skinner (1931, p. 194), Stair (1895, p. 109), Steward (1949, p. 744, 749), St. Johnston (1921), Stokes (1932, p. 600), Sullivan (1922; 1923, p. 229), Taylor (1923, p. 255; 1924, p. 480), Valcárcel (1935 b), Weckler (1943, p. 36), Wilson (1862), Wissler (1917, p. 61, 336), and many others.

striking to be dismissed without grave consideration, and too numerous, in the aggregate, to seem the result of pure chance."

Handy (1930 b, p. 104) emphasized: "There are innumerable traits in aboriginal American cultures whose parallelism with Oceanic and Asiatic traits is very difficult to explain except on the grounds of common origin and transference. At the same time there are in Polynesia many traits apparently related to American rather than to western Oceanic or Asiatic culture. In consideration of these facts, as a Pacific ethnologist with an admitted Polynesian bias, I have no hesitation in saying that for me the balance of evidence favours the likelihood of transference of cultural traits from Polynesia to America and vice versa."

Why then, has a close study of American-Polynesian affiliations not been attempted? Only because so exceedingly few observers have shared Handy's view that between the aborigines concerned culture elements may spread downstream as well as upstream.

The fact that Asia, and Asia only, has been the truly "Old World", even to aboriginal man, has so strongly influenced the views of Polynesian observers that any indication of an oversea transfer at the other end of the Pacific, between Polynesia and America, has automatically been treated as a question whether Polynesians could even have *reached America* on their eastward push *from Asia*. In other words, any writer attempting to explain American-Polynesian identities and similarities by diffusion has almost invariably considered it necessary to take Polynesian voyagers even further east against the winds, instead of taking them out of America.

American-Polynesian chronology

Some early writers who were still duly impressed by the trade winds, have, like Zuñiga (1803, pp. 26-30) suggested that Indonesia was peopled *from America* by way of the Polynesian islands. But lonely Polynesia cannot very well have served as a stepping-stone for primeval migrations in any direction that brought early man to unoccupied continents or continental islands. The Polynesian islands were not known to man in periods when American and Indonesian aborigines were still in their primary moulding. It is only a logical consequence, as Gregory (1927, p. 227) remarks, that: "In view of the difficulties of settlement it need occasion no surprise to find that Polynesia was the last part of the Pacific, and probably the last large area on the earth's surface, to be colonized."

It is a generally admitted fact that the Polynesians, although possibly mere coastal voyagers in their original homeland, gradually developed an almost unsurpassed maritime skill in the course of generations on their small oceanic islands. At the peak of their navigational skill, when all Maori-Polynesian traditions show that a vortex of inter-island trade and conquest existed, it is fully possible that local exploring parties could have beaten up wind to America, particularly if they knew of the existence of this vast land ahead of them. But this period must have been so recent that the exploring crew would have found no virgin land outside their own oceanic habitat.

Hrdlička (1923, p. 490) stated: "The Pacific islands were not peopled until relatively recent times, later than America itself, ... If any parties of these islanders ever reached the American continent, which is not impossible, they could have come only after the Indians had spread over it and were well established, and while such parties could have introduced perhaps a few cultural peculiarities, they could not materially have affected the population."

In relation to Asia, America is rightly called a New World, yet in relation to Polynesia, America is exceedingly old.[1] Most of the New World culture elements that reappear among the Polynesian islanders existed locally in America in periods antedating the earliest settlement of Polynesia; a few have a wide geographical distribution within America; and, in some cases, an evolution from primitive local forms may be traced in that continent. That the Polynesians originated or inspired the aboriginal cultures of early America is thus as impossible as it is unnecessary as an explanation of the local American facts.

It is even unlikely that any Polynesians can have reached America as settlers after they had acquired the Melanesian outrigger, as this was entirely unknown among the American aborigines, in spite of the sporadic existence of suitable canoes from the coast of Alaska right down to Chile.

The consequent attempt, by those who have defended an American-Polynesian relationship, to represent the young Polynesians as mobile givers and the American aborigines as static recipients has thus been disproved and rejected by critical scholars with no great difficulty on the ground of an utterly impossible chronology. In spite of the most conclusive evidence that has from time to time been propounded in support of some American-Polynesian contact, the theories of local diffusion have failed to gain general recognition. When well-established, ancient and locally widespread American culture elements are quite unnecessarily claimed not to be of local origin but brought from some island in Polynesia, because the unidentified and rather recent settlers on these tiny islands happen to share them with ancient America, then diffusion seem to be of rather doubtful value. It is against this background that independent-evolutionists have opposed and refuted the diffusionist attitude in Pacific ethnology. The ultimate result is that American-Polynesian analogies have been left on one side unsettled, while any further attempt to discuss transfer and relationship between America and Polynesia has been regarded in advance with a certain amount of scepticism.

However, when we completely reverse the direction of the reasoning all such grounds for objection automatically disappear. If we suppose the American aborigines to be the ancient inventors and givers, and their young and unidentified East Pacific island neighbours to be subsequent emigrants who have carried ancient culture elements abroad with them in rather recent centuries A.D., we find at once that the American seniority of these culture elements embodies no problem at all, but offers instead the necessary foundation for just such a working hypothesis.

When we turn our attention from the west of Polynesia to the east, this is not primarily done to argue diffusion or to look for a reason for all the similarities and parallels between America and Polynesia that have so far not been adequately explained; it is done to carry the search for Polynesian migratory routes into a marginal territory that has not previously been examined for such possibilities.

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[1] As is well known, the accepted date of the first human arrivals in the New World has been pushed back by several millennia in recent years, and the antiquity of the whole human prehistory in America is still in the melting pot. (See e.g. Carter 1951.)

With the New World as Maori-Polynesian stepping-stone a new route but not a new source is proposed

In deserting Indonesia and the Old World we know at least that we are leaving behind an area that has been examined and reexamined for Polynesian vestiges for many generations, without an unanimous opinion being reached as to either source or route. It is not my intention to deny that the Polynesians, to a certain degree, have distant relatives among the Malay people. I only doubt whether any Polynesian ancestors ever dwelt on the Malay islands. I fail to see why we, when discussing Malay-Polynesian relations, should always regard the Polynesians as migrants to Polynesia and the Malays as stationary in the Malay archipelago. We know well enough that the Malays are not autochtonous of their present archipelago, but emigrants from the continent beyond. It is therefore very possible, in fact highly probable, that the present Malays, as much as the Polynesians, have moved in the long ages that have passed since their parental stocks were in contact. If so, the Indonesian archipelago can not, any more than can the Polynesian islands, be the geographical area where the old ancestral lines of these two peoples converge. Like the Polynesian, the Malay line goes back to continental Asia. It is indeed the Malay *people* and not their archipelago that possesses rudimentary evidence of early contact with a palæo-Polynesian stock.

The Polynesian ancestors left the coastal area of Eastern Asia as a neolithic people before the high local civilizations developed. So did the Malays, and so did all the American Indians. We do not have to diverge from any of the known facts and established principles of Polynesian anthropology if we suggest that the Polynesian ancestors left East Asia on their prolonged neolithic migration to Polynesia, not necessarily by sailing slowly or quickly through the Micronesian ocean, but by following the Asiatic coast (or the east-bound Kuroshiwo Current) from the mainland of Southeast Asia (or even the Philippines) to a temporary abode and final embarkation place in the higher latitudes of the Pacific. Such a journey, like any other that could satisfy Pacific chronology by bringing ancient emigrants from stone-age Asia ashore in Polynesia in recent time, necessitates a long delay somewhere en route. This intermediate stopping-place must have been a maritime centre, to permit the final thrust down-wind into the open East Pacific.

An American archipelago in the Northeast Pacific

Generally speaking, the straight and open coastlines of the two American continents are not very inviting for the local development or continuation of a truly maritime culture. As was to be expected, therefore, the vast majority of American Indians are noted neither for seamanship nor for maritime exploits. Even though some of their ancestors may originally have entered America by boat across the Behring Straits or from island to island along the Aleutians, their descendants have spread over the vast American continental plains and forests, or settled in canyons and on mountain plateaus. The great variety of new cultures that arose within the New World were almost entirely dependent upon the nature of the land, and agriculture and hunting thus became the fundamental occupation of the vast majority of American aborigines.

There are, however, a few striking exceptions. Along the east and west coast of both American continents, certain aboriginals sustained life almost entirely as fishermen.

A glance at the map will show that nature has provided man with an ideal base for coastal navigation in the extreme northwest of America, just where the warm Asiatic current happens to arrive from the Philippine Sea. Here, at the very gateway to aboriginal America, we find a ragged coastline, dotted with islands, channels and fjords. In fact, the mild climate and sheltered island coast of Southern Alaska and British Columbia is in every respect a true reproduction of the conditions in Norway which encouraged the seafaring evolution of the Vikings.

Few travellers came to know this coastal archipelago and its native occupants as intimately as Adrian Jacobsen, who made his collections and carried on ethnographic field-work among the local tribes in the latter part of the last century. In his paper on Northwest American-Polynesian analogies, Jacobsen (1891, p. 163) makes this careful statement: "It is far from my intention to argue a direct relationship between Alaska, British Columbia, and the Pacific Islands, either in respect of physical anthropology or ethnology. Yet I may well point out how great a similarity exists between the cultural products and the physical appearances of the peoples in both territories, indicating that it would seem well worth while to study these relations more closely than hitherto."

Shortly after, Schurtz (1895, p. 41), in his study of ornamental art in countries round the Pacific, came to the conclusion that an ancient ethnographic problem was still outstanding in this same Pacific corner of America: "That is the question as to in what manner the Polynesians—and through them again their Malay kinsmen—are related to the inhabitants of Northwest America. Cook, Forster, and other observers, even in their early days, pointed out the kinship between these ethnographic areas, and many efforts have subsequently been made to gain a clear understanding of these relations."

We may in these hints see a possible clue to a favourable geographical stepping-stone from Eastern Asia to Polynesia, since nature has provided the Northwest American Archipelago with a natural seaward *entrance* from Eastern Asia, and a natural seaward *exit* in the direction of Hawaii. Before we consider any other section of aboriginal America, we shall see whether the Northwest Coast Indians and their territory can satisfy the many requirements which, in a critical analysis of Polynesian migration routes and resting-places, have so far made other alternatives impossible.

The Pacific coast of Southern Alaska and British Columbia offered a scarcity of level land to the early human settlers, since steep cliffs fell straight into the labyrinth of channels, bays, and winding fjords, or right into the open ocean. Only at long intervals did a narrow valley or an inhabitable beach open up in the precipitous landscape to give space for a seaboard village or a maritime community that could flourish without access to fields or pastures. Yet the local archipelago offered an abundance of food and other riches for neolithic man. The sea was alive with easily catchable fish, while giant pine and cedar-trees grew right down to the foot of the hills and valleys, offering a straight-grained wood that was easily split and carved with the tools of a stone age culture.

Goddard (1924) commented: "On the whole, the Northwest-coast of America is exceedingly favourable for the development of a culture which depends almost entirely upon canoes for travel and transportation, and upon the sea for its supply of food. ... In this very favourable environment, with its abundant food supply, grew up, since the retreat of the last great ice-age, a very rich and special culture, quite unlike, in most respects, any other in aboriginal America."

The Asiatic origin and local chronology of the Northwest American tribes

We know to-day that the Indians of this Northwest American Archipelago, like the Malays of Indonesia, are descendants of original migrants from Eastern Asia. There is still some disagreement as to the local antiquity of these tribes; some favour a very early date for their arrival from Asia, whereas others believe they came not so very long before the Christian era. Haddon (1924, p. 127) says: "The North-west Coast population on the whole belongs to a later and distinct migration from Asia. Evidence is accumulating in support of the view that the great Athapascan group was the last racial migration from Asia."

In any case, they must have left Eastern Asia before the iron age began in that continent. Until the arrival of Russian and English fur traders in recent post-Columbian time, the Northwest Coast Indians made all their tools of stone, bone, horn, and wood, and were as ignorant of the use of iron as all the other American aborigines to the east and south of them, and as the unidentified people that pushed into Polynesia in the late Christian centuries.

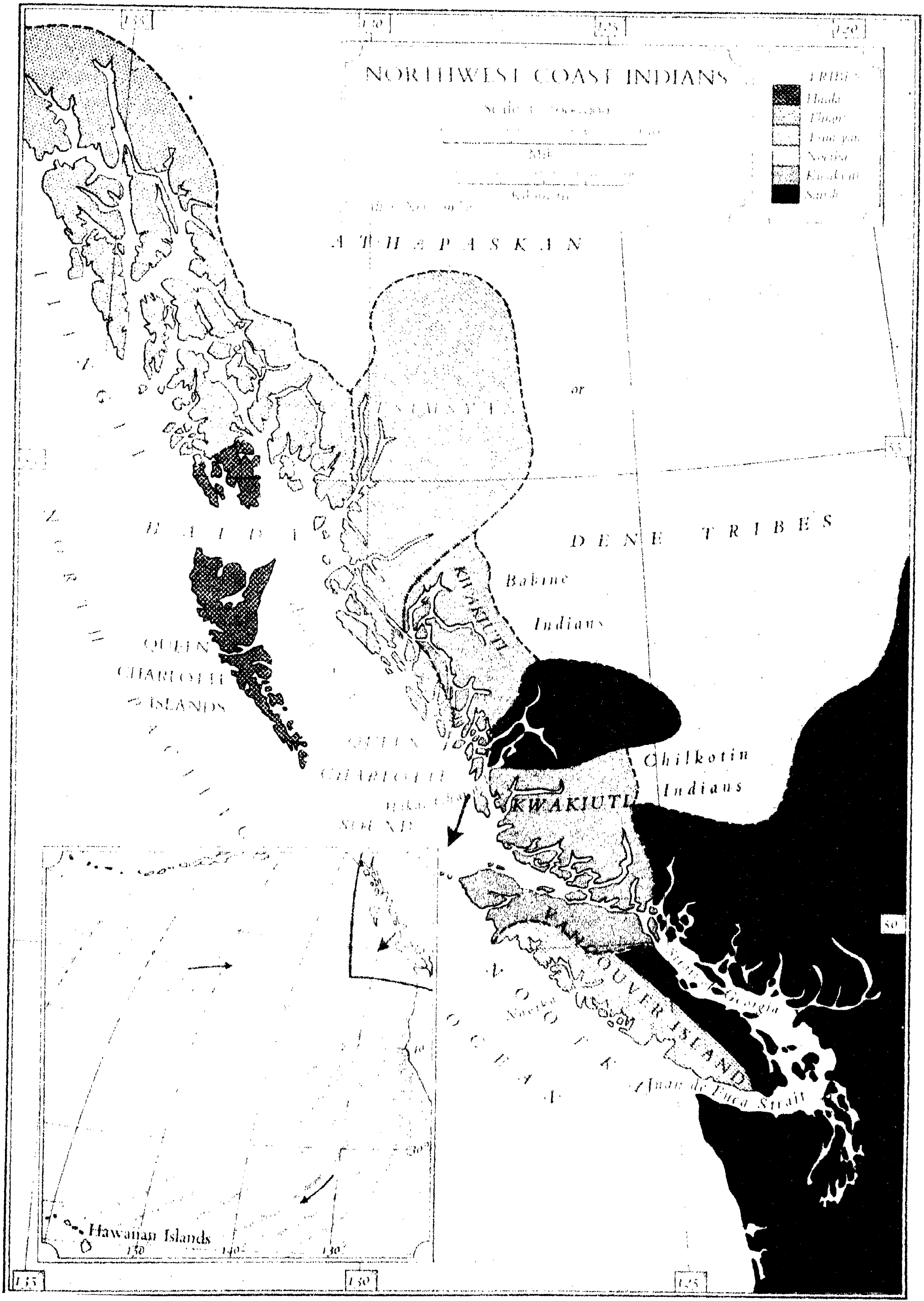
How the Northwest Coast Indians arrived from Asia is not known. There is some evidence that they came direct by craft, and there is other evidence that they only reached their present habitat after a sojourn in an ancient cultural base further inland in northwestern North America. The most plausible answer seems to be that what to-day are grouped as Northwest Coast Indians represent the mixed descendants of early immigrants who arrived partly along the coast and partly from the interior.

From his studies of the local culture patterns together with the distribution of the various local languages, Boas (1902) early inferred that extensive migrations and disturbances must have taken place in and near the Northwest American Coast Archipelago in prehistoric times. A growing majority of scholars seem to believe that *part* of these ethnic disturbances were due to inland tribes pushing their way from the eastern hinterland towards the coast and coastal islands in fairly recent pre-European centuries, when the seaboard area was already inhabited by coastal tribes. This hypothesis was first based on archaeological evidence furnished by H. I. Smith (1903; 1907). He discovered various similarities between the early coastal culture and that of the interior, and although he partly explained this as due to marginal exchange, he also postulated that ethnic migrations must have taken place from the inland to the coast. Kroeber, who like previous observers fully realized the significant Asiatic elements in the Northwest Coast culture pattern (1923), gave full support to Smith's view, and suggested (1939, p. 28) that the prototype to the Northwest Coast culture was to be paralleled among the local hinterland and intermountain tribes of our day.

Collectively known as the Northwest Indians, the whole distinct group of American aborigines under consideration has differentiated into several mutually related but easily distinguishable sub-groups, of which the principal are the *Tlingit*, *Tsimsyan* (commonly spelt *Tsimshian*), *Haida*, *Kwakiutl*, *Nootka*, and *Salish*. (See map.) Little has been known about the relative antiquity of these coastal tribes, although it was early realized that both the Tlingit and the Tsimsyan were comparatively new arrivals in their own domain. But a considerable step forward was recently made by Drucker's "Archaeological Survey on the Northern Northwest Coast" (1943). The ethnographic area of the Northwest Coast is frequently divided into a northern, a central, and a southern sub-division. Drucker's analysis revealed (*Ibid.*, pp. 125—127) that the northern (i. e. Tlingit-Tsimsyan-Haida) and southern (i. e. Coast Salish) sub-divisions were strongly affected by the interior mainland. He found reason to suspect that, for the southern area at least, these interior elements seemed to "overlie an older purely coastal component." Of the central or Kwakiutl area he says: "I would stress that its outstanding characteristic, that which differentiates it from adjacent divisions, is the absence (or much smaller quantity) of elements traceable to interior influences. . . .In this regard the Kwakiutl differed from Tlingit and Tsimshian to the north, and from the Coast Salish in the South." From his excavations of some of the many deep prehistoric Kwakiutl middens, Drucker found an apparent absence of any abrupt cultural change in this central area, and due to this local absence of stratification he suggested that the Kwakiutl of all the local tribes may represent the purest surviving form of the original coast-dweller culture. He adds: "Whether not only the purest but the oldest coast-dweller culture is to be found in this region, only further investigations can determine."

It has been a long-standing illusion that the archaeology of the Northwest Coast is very limited and shallow. At the turn of the century Hill-Tout called attention to the existence of large middens at the mouth of the Fraser River, in present Coast Salish domain, and Hill-Tout and H. I. Smith began the first limited archaeological survey in this southern area. But until Drucker in 1938 began his archaeological survey in the central section of the British Columbian coast, this vast territory extending as far north as southwestern Alaska had been left to the mercies of casual specimen collectors. Drucker (*Ibid.*, p. 115) is therefore fully justified when he points out that: "The prehistory of the Northwest Coast has been sadly neglected." He states in his introduction (*Ibid.*, p. 23): "The Northwest Coast, so well studied by ethnographers and linguists, has been grievously neglected as a field for archaeological research, . . . The reason for this neglect stem from the belief that the coastal sites are small and few, that they are poor in artifactual material, and that much of what material they contain is so poorly preserved owing to climatic conditions as to be irrecoverable. Actually, along the entire coast, sites, consisting of middens of occupational debris on which the villages stood, are both numerous and large. Their artifact content is not high, compared, for example, to that of Eskimo sites, and the lack of pottery is a handicap to survey and stratigraphic testing, but the fact remains that they do contain a moderate per-yard quantity of artifacts, . . . Archeological research in the area is not only desirable but entirely practicable."

Drucker's own survey resulted in the location of 61 ancient midden sites in Coast Tsimsyan and Kwakiutl territories. He states (*Ibid.*, p. 111): "The survey located only a fraction of the total sites in the region surveyed. To account for so many middens we must assume that the dense population of the early historic period, which was functionally linked with the basic economy of the area, was no new condition but one of moderately long standing. The only alternative would be that the region has been occupied by a small population for an extremely long time, a view for which I can see little justification." Also (*Ibid.*, p. 113): "There is no key as yet to the temporal span represented by the midden de-



GENERALSTABENS LITOGRAFISKA ANSTALT

posits. The tremendous extent of some of the winter village sites suggests a fairly long period of accumulation, particularly in view of the fact they were occupied only part of the year."

The most recent opinion on the question of inter-tribal chronology on the Northwest Coast has been voiced by Borden (1951). In his paper "Facts and Problems of Northwest Coast Prehistory" he agrees essentially with the conclusions reached by Drucker. He refers to parallels existing between the northern and the southern aspects of the coast culture, and writes: "As Drucker points out, most of these parallel traits can be attributed to interior influences. It is the absence or paucity of such interior traits which sets off the Central aspect from those to the north and south. Since Drucker found no evidence of culture change in the deep deposits he tested in Kwakiutl territory, he took this lack of interior traits as a hint that in this Central aspect represented by the Kwakiutl, may be seen the coastal culture of purest strain, and perhaps also the oldest. ... He justly pointed out the probability that the aspect least related to the interior is the oldest." Reviewing our present knowledge of the chronology of the Northwest Coast, Bordon agrees essentially with Drucker's conclusions, but asks (*Ibid.*, p. 39): "If the Tlingit, Haida, and Tsimshian, and the evidently also intrusive Coast Salish are all comparatively recent arrivals, the question arises, which of the remaining Indian groups was first to move into the coastal area? The possible choice is narrowed down to the two branches of the Wakashans, the Kwakiutl, and the Nootka. Drucker, it will be recalled, was inclined to regard the Kwakiutl as possessing the coastal culture of oldest and purest strain. It is curious, however, that the Nootka are not even mentioned in Drucker's discussion of Northwest Coast archeology. Numerous facts lend support to the assumption that the Nootka are *the* Indians who have lived longest on the coast. One should mention first their isolated location, a position to which they probably withdrew under the pressure of later intrusive groups. They developed the most maritime culture of all the coast Indians. ..."

As Borden also mentions, there is early archaeological evidence suggesting former Eskimo distribution as far south as in present Coast Salish habitat. But the central Northwest Coast tribes—the Kwakiutl and the Nootka—are not of Eskimo descent, and as they seem to represent the purest descendants of the original maritime stock of the coast, with a local habitation antedating the recent arrival of the inland conquerors, we may see in them—perhaps more than in their neighbours—the survivors of coastal immigrants from somewhere in Eastern Asia.

Referring to such Northwest Coast Indian elements as reached their present domain by sea, Barbeau (1934; 1945; 1949) maintains that they did not, like perhaps most other peoples of the New World, descend from migrants who followed the narrow northern crossing of the Behring Straits. In the opinion of this Canadian authority they came by boat from island to island along the Aleutian ridge, from the Kurile chain of islands and Kamchatka, or else directly oversea on the Kuroshiwo Current from the Philippines or the China Sea.[1] Heine-Geldern (1950 a, p. 351), in comparing the art styles of the coastal tribes of British Columbia and Southern Alaska, with one element in the art of the Shang period of China, and with certain monuments and ritual objects in Borneo, Sumatra, New Guinea, and northern New Ireland, shows that they "are based on the same stylistic principles and, moreover, have a considerable number of very specific motifs in common. The style in question must have spread from China, eastward to America and southward to Indonesia and Melanesia. Its transmission to America cannot have taken place later than the first half of the first millennium B.C., while an earlier date seems not improbable."

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[1] Barbeau (1945, p. 439) and True (1884) refer to the finding of a pair of babirusa, or wild boar, tusks from the South China Sea in the grave of a Queen Charlotte Island medicine man, and asks pertinently how these tusks from Indonesia could have found their way into the sacred possessions of a Northwest American shaman. We cannot, however, do more than raise the question, as we have no means of knowing how long the tusks have been in the hands of the local tribe.

The existence among certain East Asiatic tribes of a type of craft apparently related to the Northwest American seagoing canoe may also indicate that Northwest American immigrants came from Eastern Asia by boat (Olson, 1927—29). This possibility is strengthened by an old Queen Charlotte Island tradition concerning the earliest arrival of the tribal progenitors, which records (Barbeau 1945, p. 426) that: "Six canoeloads of people, headed by chief Githawn, Salmon-Eater, once sailed out of 'the foam' (the sea). These seafolk beheld a new land to the north or to the east, set foot ashore, and established their first camp. They were pleased with their discovery, for existence here was to their liking. But they were not the only occupants of this land; others had preceded them."

Whether these various seafaring pioneers all arrived in one group or in two or more successive migrations, and whether they came in a prolonged coastal trek, or by drifting craft from the China Sea in a matter of weeks, has no direct bearing upon the present problem. What matters is that their descendants settled on the Pacific Northwest coast of America where they gradually mixed in various proportions with people pressing down to the coast from inland; and that here they dwelt in a mixed state and with a neolithic and maritime culture right from the time of their arrival from Eastern Asia until their recent contact with Europeans. Whether some of them also were pushed further out to sea in the same period, is the object of present study.

The possibility of relationship to the Maori-Polynesian tribes

Describing how the Northwest Indian habitat is distinctly sealed off from inland tribes by lofty and steep mountainranges, while the Pacific Ocean isolates their archipelago from contact in any other direction, Schurtz (1895, p. 14) adds: "It is very doubtful if the sea represented such an effective demarcation line in former times also. The Asiatic relations of the Northwest Indians are no longer doubted, and a connection with the Polynesians has often been assumed, although it has never been clearly proved."

We shall now consider the possibility of this latter relationship.

When comparing the Polynesians with the Malays and other kindred Yellow-brown peoples, the first difference we found between them and the Yellow-brown norm was in their Caucasian-like aspect and remarkably light skin colour. We saw with Dixon that similar deviating physical forms are well known in aboriginal America. Also Boas (1925, p. 22) said of the aborigines in the New World:

"It is, of course, true that the Indian type is not by any means uniform. The pigmentation differs from a dark brown to almost European lightness; . . . the hair is not always straight and black, but may be brownish and wavy."

The light complexion of the Northwest American Indians

As to the skin colour of the Northwest Indians in particular, we must first consult those early voyagers who saw the local coast Indians before the admixture of European blood.

Captain Cook (1784, Vol. II, p. 303) who was the European discoverer of the Nootka tribes on the ocean side of Vancouver Island, said of those natives who were not covered with red paint that, "the whiteness of the skin appeared almost to equal that of Europeans; though rather of that pale effete cast which distinguishes those of our Southern nations. Their children whose skins had never been stained with paint, also equalled ours in whiteness." In another connection Cook (*Ibid.*, p. 367) wrote of the Pacific tribes even up in Prince William's Sound, Alaska, that: "The complexion of some of the women, and of the children, is white, but without any mixture of red."

A little later, Captain Dixon (1789, p. 238) came to the same American coast, and wrote of the local Northwest Indians in general: "In regard to their complexion, it is no easy matter to determine what cast that is; but if I may judge from the few people I saw tolerably clean, these Indians are very little darker than the Europeans in general."

After him came Vancouver, in whose honour the principal island has been named. He wrote of the natives along the Burke Channel, in the heart of the Northwest Coast (1798, Vol. II, p. 262): "The prominence of their countenances, and the regularity of their features, resembled the northern Europeans." Vancouver found that if it were not for all the oil and paint "there is great reason to believe that their colour would have differed but little from such of the labouring Europeans, as are constantly exposed to the inclemency and alterations of the weather."

These claims by the early explorers have since been verified. Scouler (1841, p. 218) wrote about the Haida tribes of the Queen Charlotte Islands: "Their complexion, when they are washed and free from paint, is as white as that of the people of the S. of Europe."

Niblack (1888), in his report on "The Coast Indians of Southern Alaska and Northern British Columbia", said: "In complexion both sexes are surprisingly light coloured. This is in no way due to intermixture with whites. ... The Haidas are markedly fairer skinned than the others, but still the dark tinge is quite apparent, and exposure always adds to it."[1]

Skin colour and physiognomy recall Polynesian peculiarities

This is precisely what we found among the unidentified Yellow-brown people who reached Polynesia by sea at the opening of present millennium. Polynesians, who are kept away from constant exposure to the sun, as in the ceremonial bleaching houses found in many parts of their islands, become as light in complexion as a slightly tanned South European, whereas the constant baking in the tropical sun gives the average islander a golden-brown hue which is still considerably lighter than the Malay complexion, without approaching the yellow colour of the East Asiatics. (See Ellis 1829, Vol. I, p. 83.)

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[1] Bancroft (1875, Vol. I, p. 157) repeats about the same aborigines that: "The few who have seen their faces free from paint pronounce their complexion light..."; and he quotes Poole, who found their skin "nearly as white as ours"; Bendel, who held it to be "of a remarkable light colour"; and Hale, who found some of these coastal islanders "fair in complexion, sometimes with ruddy cheeks".

In his life-long study of Northwest Indian tribes, Hill-Tout (1898) observed: "There is nothing in the appearance of our Salish tribes here, generally speaking, to make their kinship with the Polynesians an improbability as far as colour goes." He further wrote: "I have seen members of the Squamish tribe whom I could with difficulty distinguish from some of the Samoans who returned from the Chicago fair this way, and camped at the Squamish village here. ... And the anatomical data given by Wallace (from Polynesia) agrees substantially with that of the coast Indians given by Dr. Boas."

With no less personal knowledge of the people of whom he spoke, Jacobsen (1891, p. 162) described how he was directly struck by the "remarkable similarity" between the Northwest American Haida and Kwakiutl, and their oceanic neighbours in Hawaii. He quoted an example: "Thus I met once a Sandwich Islander on a small island near Vancouver, who was married there and had a family. I could not discover any noticeable difference between him, his children and his neighbours, either in build or in colour of skin."

Taylor (1924, p. 480, pl. 7), in a plate illustrating the differences between the Malay, Austro-Melanesian, and Polynesian physiognomies, rather unexpectedly introduces a Salish Indian from Northwest America, with the following justification: "The high Amerind of Salish race is added to show his Polynesian 'European' appearance." Similar statements have often been made.[1]

To secure a personal first-hand impression of both these two Pacific peoples, I went to live among the Northwest Indians shortly after spending a year with the natives of Polynesia. Like so many others before me, when I came in contact with the various tribes of this ancient fisher population northwards along the island-dotted coast of British Columbia, I had full opportunity to observe that physically there was as little difference between a Polynesian and, for instance, a Kwakiutl, as there was locally between a Kwakiutl and a Tsimsyan or Tlingit Indian—and sometimes even less. There were Kwakiutl Indians on Vancouver Island, and also Bella Coola Indians on the mainland further north, who even bore personal resemblance to individuals I had met in the Marquesas Islands, the Tuamotus, and the Society Group of Polynesia.

Very characteristic was the fact that putatively full bred Kwakiutl and Salish Indians, as stressed by the early discoverers, had a remarkably European-like countenance, yet with a more or less apparent underlying Asiatic or Mongoloid stamp, precisely as is the case among so many Maori-Polynesians.

Local occurence of the aquiline nose

As in Polynesia, so also among these Northwest Indians, the nose is occasionally rather flat, soft and wide, but quite frequently it takes a narrow and plainly aquiline shape, such as is even more characteristic of many other tribes of aboriginal America.

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[1] Schurtz (1895, p. 42) observed: "Finally, the light-coloured Northwest Americans are even in somatical respect extraordinarily like the Polynesians, and particularly the Marquesans." Allen also (1884, p. 263) referred with Pickering to the fact which has created many strange theories, namely: "The impression of Hawaiian islanders, and white traders from the Sandwich Islands, is that there is a strong Polynesian element in North-Western America." Degener (1949, p. 195) says: "M. J. Brown sees in their physical appearance a blood relationship between the Maori of New Zealand and the Haida Indians of the northwest coast of North America."

Local occurrence of tall stature

In stature most of the continental Northwest Indians are only slightly taller than the Malays. But from Vancouver Island and northwards to the Tlingit the average stature increases from 165 cm to well above 170 cm (Boas 1895 a, p. 376), and thus corresponds favourably to the average of the New Zealand Maori, which is 170.6, the Marquesas Islander, which is 170.44, and the Hawaiian, which is 169.51.[1] The somewhat higher averages of the Society Islanders, Samoan, Tongan, and Easter Islanders, which are respectively 171.02, 171.7, 173.0, and 173.32, are frequently reached among the outlying Haida of the Queen Charlotte Islands, and the Kwakiutl of northwestern Vancouver Island. Among these island tribes, as among the Maori-Polynesians, men of six feet have not infrequently been found.

As Bancroft (1875, Vol. I, p. 157) sees it: "Favourable natural conditions have produced in the Haidahs a tall, comely, and wellformed race;..." Newcombe (1907, p. 146) points out how the first explorers wrote from the same Northwest Coast islands that in stature these natives were not inferior to Europeans, a general statement which Cook (1777) repeatedly made about the Polynesians.

Local instability in hair colour and texture

We noticed in Polynesia a divergence from the Yellow-brown norm in that the hair, although commonly coarse, straight and black, was not always so, but could occasionally be soft and wavy and sometimes even of various shades of brown and auburn.

In Northwest America we find just the same tendency to diverge from the Asiatic norm. Bancroft (1875, Vol. I, p. 157) says of the tall Haida: "The hair is not uniformly coarse and black, but often soft in texture, and of varying shades of brown, ..." And of the smaller Nootka Indians: "The hair, worn long, is as a rule black or dark brown, coarse, and straight though instances are not wanting where all these qualities are reversed." He quotes Sproat, who describes a local Indian woman who had "curly, or rather wavy, brown hair", pointing out that: "Now and then, but rarely, a light-haired native is seen"; also Grant who found the hair of the Vancouver Islanders "invariably either black or dark brown", and Sutil y Mexicana, who declared that the hair of these aboriginals "varied in colour between reddish, dark, auburn, and black."

Pointing out that the Northwest Indians have a lighter skin and hair than other North American Indians, Haddon (1924, pp. 33, 128) states that "there are even a few tribes among whom red hair and an almost white complexion occur". He also shows as an anatomical characteristic among the Northwest Indians as a whole, that the hair "is frequently slightly wavy and brownish".

Local growth of beard

Another strange peculiarity in Polynesia was the occurrence of beards among islanders who were supposed to be descended from beardless Malays. It is therefore interesting to note how Captain Cook (1784, Vol. II, p. 301) observed that at the time of their discovery the Nootka men of Vancouver Island had a marked growth of beard. He made the same observation up at Prince William's Sound, where "several of the elderly men had even large and thick, but straight beards."

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[1] Polynesian statures are cited from Shapiro 1940 b.

Captain Dixon (1789, p. 238), arriving only a few years later, also wrote: "...all the men we saw, who were advanced in years, had beards all over the chin, and some of them whiskers on each side the upper lip."

Scouler (1841, p. 218) writes of the Haida: "This northern family, if we select the Queen Charlotte's Islanders as specimens, are by far the best looking, most intelligent and energetic people on the N. W. coast, and in every respect contrast favourably with the Southern tribes of Nootka Sound and the Columbia. They are taller and stronger than the Nootkans, their limbs are better formed, and their carriage is much bolder. They permit the hair of the upper lip to grow, and their mustachios are often as strong as those of Europeans."

Bancroft (1875, Vol. I, p. 157) quotes Hale on the same peculiarity among Northwest Indians: "What is very unusual among the aborigines of America, they have thick beards, which appear early in life." He adds: "...indeed there seems to be little authority for the old belief that the Northwestern American Indians were destitute of hair except on the head."

Craniological agreement with Polynesia

The average craniological indices from the various Polynesian groups compare favourably with those given by Oetteking (1930) and Hrdlička (1944) for the respective Northwest Indian tribes. Hrdlička gives the average cranial index of Northwest Coast Indians as 81.19 for males and 81.4 for females. This matches the 81.27 which is the average cranial index of six main Polynesian groups, namely: Hawaii 84.01, Society Islands 83.61; Samoa 81.30; Tonga 81.10; Marquesas 79.89; and New Zealand 77.7. (Shapiro 1940 b, p. 28.) As an average, Hrdlička gives the Haida 83.9, which concurs with the Society Islander's 83.61.

Haddon (1924) gives the average cephalic index in Polynesia as 82.6, and the average for the Haida as 82.5. He gives the Kwakiutl index as 84.5, which is matched by their neighbours in Hawaii with 84.01.

True dolicocephaly is also known from the Northwest American coast, but only from prehistoric middens. (Hill-Tout, s.a.; etc.)

Although the present author does not feel justified in drawing strong conclusions from the average cephalic indices among Polynesian tribes, the above data have been included to show that, if anywhere, these averages may be matched among Northwest American Indians.

Information gained from an analysis of Pacific blood group distribution

We may with much more confidence trust whatever indications may be drawn from a comparison of the local blood group distribution. Boyd (1950, p. 91) says:

"The study of blood groups is of value to physical anthropology because they are genetically determined by a known mechanism, absolutely objective in character, completely unaffected by environment, not subject to mutation at any rapid rate and nonadaptive as far as extensive investigation indicates. These merits should render blood groups a most useful criterion in elucidating the classification of mankind and human evolution."

There is thus every reason to agree with Ride (1934, p. 2741), who pointed out that an analysis of the local blood groups "should prove of great ethnological value to those interested in the peoples of the Pacific."

We have already seen how drastically the Polynesians diverge from the norm of Indonesian, Melanesian, and continental Asiatics in an analysis of their blood group factors. We shall now take up this important question for further inquiry, and shall bring their American neighbours into the picture.

It can immediately be said that simply in the ratio of the four blood groups, O, A, B, and AB, we have radical means of distinguishing most aboriginal American sub-groups from most of those in Southeast Asia. It is well known that the B factor (and with it the AB factor), which reaches its world maximum among the peoples of southern Asia, happens to be the one blood group factor which is almost absent or extremely low in aboriginal America. (Snyder 1926; Boyd 1939 a; 1939 b.)

The reason for this great split between Asiatic and American peoples has been much discussed, as it is too important and far-reaching to be the result of a coincidental reversion among one or two American tribes. Koppers (1945, p. 14, with Ashley-Montagu) discusses the possibility that the earliest American immigrants may have had some B, since B is present among a few South Americans, who have been gradually pushed into the southern part of this continent. Later, he says, all subsequent immigrants could have been type O, like the aboriginal tribes of the far northeastern corner of Asia, at the gateway to the New World.

This may perhaps be the most plausible explanation; unless all Eastern Asia was originally O at the early time when the bulk of the Americans' ancestors moved away on their trek into the New World, the B being a subsequent intrusion into the tropical and temperate areas of Asia.

Which of these alternatives may prove to be correct is again only of secondary importance in the present context. In either case the fact remains that there has been a major cleavage in blood types between the American and Asiatic peoples in the long era that has passed since they settled on opposing sides of the broad Pacific.

As the scattered Polynesian tribes, at a much more recent period, left one or the other of these continents to settle the interlying atolls and isles, this cleavage between American and Southeast Asiatic blood types gives us perhaps the best possible opportunity to test from which side of the ocean the late Maori-Polynesians set out in their craft. If the Polynesians, like their older Melanesian neighbours, had started from Indonesia, then they should be high in B and AB like all Melanesian tribes, and like all the peoples that still dwell in the Indonesian islands or on the continent behind. Even the Micronesians are high in B, but we cannot know to what extent this may be due to the strong Melanesian element in this people. As soon as we reach Polynesia, however, the B and AB drop to the remarkably low American level.

Shapiro (1940 a) has collected blood samples from various islands in Central and Eastern Polynesia, and the essence of his interesting findings is (pp. 411, 413): "It is at once apparent that groups B and AB are negligible in Central and Eastern Polynesia." And: "Over a large part of the territory the actual evidence reveals that B is absent. Where it does occur in Tahiti, Hawaii, New Zealand, and Easter Island, its concentration is negligible and may be referred to European admixture."

The sampling among New Zealand Maoris was done by Phillips (1931), who first ascertained, through a study of the genealogies, that the 200 natives tested were of pure blood. Only two individuals, the purity of whose blood could not be ascertained, possessed the B factor, which was otherwise entirely absent among all the known full-blooded Maoris. Phillips' own conclusion is that (p. 287): "The pure Maori race probably does not contain the 'B-b' agglutination system." Also that: "The weight of evidence therefore seems to point to the fact that the descendants of the Maori immigrants from Hawaii fall into two blood groups, corresponding to Groups 2 (i.e.: A) and 4 (i.e.: O) of Moss when classified by means of known sera."

In the northern extremity of Polynesia, Nigg (1930) tested over 400 Hawaiians from the islands of Maui, Hawaii, and Oahu. She found only 2.2 % to possess the B factor and 0.5 % the AB. The results of Nigg's examination of the native Hawaiians attracted attention of American-Indian blood experts, as her results concurred entirely with certain local North American data. Matson (1933; 1936; 1938; 1946), together with Schrader, had discovered that American Indians were not only O but also A, and that there was a very high percentage of A in spite of the absence of B among full-blooded Blackfeet and Blood Indians of the northwestern United States and Canada. Matson (1946, p. 22) himself pointed out how his own North American findings appeared to be matched, even to the detail of sub-groups, among the Polynesian aborigines of Hawaii. This convergence of North-American and Polynesian blood types has quite recently led to Matson's specific sampling of the interjacent Kwakiutl Indians on the Northwest Coast, but the result of this analysis was not yet known when this work went to the press.

The concurrence in Northwest-Indian and Maori-Polynesian blood groups

Three hundred Northwest Indians, mainly Kwakiutl, but also some Haida, Tsimsyan, Salish, and Nootka, were, however, sampled by Darby as long ago as 1933, at a time when the current theory was that pure American Indians possessed only the O factor, and neither A, B, nor AB. Ruggles Gates (1934), analysing Darby's samples, found (as expected) only 0.6 % B, and no AB, but was surprised to find as much as 12.7 % A; and the unexpectedly high percentage of A among these Indians combined with their European-like physiognomies to make the author deprecate the value of his results, as he became suspicious of intermixture with Europeans. Since Matson and subsequent sereologists have shown that A occurs, occasionally even in dominant percentages, among certain North American Indians, we need no longer doubt the authenticity of A among Darby and Ruggles Gates' Northwest Indians.

Boyd (1939 b, p. 228) also takes up for discussion the findings of a high A among Kwakiutl, Salish, and Tsimsyan. Referring to the fact that 58 putatively full-blooded Kwakiutl Indians at Kitimaat possessed as much as 39.7 % of A (with 58.6 % O, 1.7 % B, and 0 % AB), Boyd showed that, if this was due to European contact, no less than 70 %

of their ancestors must have been pure Europeans, as not all Europeans are A. A mathematical analysis of the data available on the blood groups of the American Indians discloses that, although some may have been pure O, the majority of North American Indians probably also possessed A in higher or lower percentages. Obviously, Matson's very high figure of up to 83 % A among full-blooded Blackfeet and Blood Indians of northwestern U.S. and Canada cannot even be reached through mere intermixture with modern Europeans.

The general result of the various blood samplings on the Northwest American coast, as listed by Boyd (1939 a, p. 162), is to show that the Northwest Indians possess a dominance of O, a strong content of A, but hardly any B and AB. With O as the principal blood group factor, the Kwakiutl and related Northwest Indians have up to a maximum of nearly 40 % A; and yet, generally, no B rising to a maximum of 2.4 % B; with no AB in any samplings. These Northwest Indian data correspond as closely to the sereological facts concerning Polynesian islanders as to those of their own North American relatives of the same mainland.

With a definite and unchangeable characteristic in the B and AB factors, which are invariably kept at a constant level at or very near zero, North American and Polynesian tribes both display some variety in the relative dominance of the O and A. In some tribes, like the Blackfeet and Blood Indians of North America, and the Easter Islanders and Hawaiians of Polynesia, the A factor out-balances the O, reaching 60 % or more; whereas in others, like certain Kwakiutl and Tsimsyan Indians of Northwest America, and the Maori and Tubuai islanders of Polynesia, the A is limited to 30—40 % or less. Thus the New Zealand Maori is even closer in blood types to the Northwest Indian Kwakiutl than to his own known relatives in Tahiti or Hawaii. And as a general rule it may be said that, so far as the blood groups are concerned, the Polynesian people as a whole fall in entirely with the known facts from the particular groups of Yellow-brown people that have settled the northwestern part of North America, both inside and adjacent to the actual Northwest Coast territory.

Returning again to Shapiro's study of the geographical distribution of the blood groups in Polynesia, we may now try to detect their roads of entry into the Pacific. It is apparent that in Polynesia, the B and AB, through their exceptional occurrence, are the very elements that would leave definite traces at their places of entry and diffusion. Shapiro (1940 a, p. 411) writes about these two factors:

"In the Tahitian population they occur to a very slight degree, 4.83 % and 0.81 % respectively. East and south of Tahiti B and AB are entirely absent in the present sampling. The percentages of O and A, however, reveal some variation from island to island. ... But despite these variations in O and A the fact remains that among 265 pure-bred natives of the Tuamotus, the Australs, Rapa, Mangareva, and Easter Island none fell into group B or AB. The presumption therefore seems warranted that these blood groups are in fact either completely absent or quite exceptional in Eastern Polynesia. In central Polynesia, here represented with Tahiti, the B factor does make an appearance, but in only a small proportion of the sample. Mixture with Europeans and recently with Chinese has permeated most of the Tahitian population and might have served as a source of origin of the small amount of B present in our series."

Showing that Samoa, Fiji's neighbour, is the only Polynesian group where B appears as a factor of any importance, Shapiro continues: "Thus only at the western margin of Polynesia does any considerable and unequivocal amount of B become evident. We have, therefore, a distribution which is closely correlated with geography. Along the eastern fringe of Polynesia, in the Tuamotus, and continuing southeastward through Mangareva and to the last outpost at Easter Island B is absent, or at the most sporadic to a slight degree. ... Along the western border of Polynesia the B factor shows a sudden increase at the precise point where this area meets Melanesia... On its face value, this distribution fits a migration history in which the earliest invaders, lacking the B factor, were gradually forced out into the easternmost margin of Polynesia and were replaced on the western side by newer arrivals, now possessing B."

This explanation does not seem quite convincing, since the Maoris lack the B factor and yet represent the very *last* arrivals. Nor does Shapiro seem to favour this hypothesis, as he admits that "other possible explanations cannot be overlooked. One that immediately suggests itself is the probability that all Polynesians including the Samoans originally had little or no B, and that the present high percentage of B in Samoa was not brought in by the late stragglers but represents the result of recent admixture with non-Polynesian neighbours rich in the B factor. ... As one moves further west B increases steadily reaching maximum in India as well as in eastern Asia and the contiguous islands. Although the high proportion of B in Samoa apparently cannot be laid to Fiji alone, it is not impossible that miscegenation with Melanesian as well as with Micronesian groups might account for this phenomenon."

Shapiro ends his interesting analysis of "The Distribution of Blood Groups in Polynesia" with the following summary based on the data now available: "...it would appear that when the first Polynesians left the Asiatic mainland they, like many American Indian groups and the Australian aborigines, lacked the B factor. In a sense all these populations are marginal in the larger Pacific area. Moreover, since the Polynesians are generally agreed to have originated in southern or southeastern Asia, areas now especially characterized by B, their deficiency for this factor is all the more puzzling. We have either to assume that the earliest Polynesians began their migrations before B became characteristic of southern Asia or else that having once possessed it they have now completely lost it. The latter is rather difficult to envisage."

But we have now offered a third and different possibility—namely, that the Polynesians did not come directly from Southeast Asia at all, but from Northwest America, a view which accords with all the existing data and removes the basic sereological problems of Polynesia.

Non-Malay peculiarities among Polynesians are shared with Northwest Indians

We have seen from the above comparison that, in as much as it is possible to compare an apparently composite stock like the Polynesian with any single outside group, they share all their dominant and most apparent characteristics with the coastal population of British Columbia and its islands. If we are to notice any distinction, it would be that among most, but not all, Northwest Indian tribes the Asiatic or Mongoloid stamp tends to emerge to a slightly stronger extent than among the Maori-Polynesian tribes. The Caucasoid stamp in physiognomy, complexion, and stature which tends to distinguish some of the Northwest Coast tribes so markedly from the Malays, seems to be stronger still on some Polynesian islands, and more generally distributed among the various local tribes. This is an important fact to which we shall return in a subsequent part (IV), when inquiring into the apparent complexity of the Polynesian origins. Let it here suffice to note that we have found in Northwest America an aboriginal insular population which represents to a remarkable degree the physical norm of the present Maori-Polynesian tribes, and which in fact concurs in all major racial characteristics with the dominant type of man as we know him in the eastermost islands of the open Pacific.

In the main we may therefore conclude that a comparative view of physical features in the racial triangle represented by the Malay-Northwest-Indian-Polynesian peoples, has led to the following general result: The Malays are the purest representatives of the Yellow-brown race. Wherever the Northwest Indians diverge from the Malay norm, the Polynesians follow the Northwest Indians. This is seen in complexion, hair, physiognomy, bodily build and blood types.

Neither the Malays, the Northwest Coast Indians, nor the Polynesians, are authoctonous to their present domains, which they have all reached by ancestral migration. The Malays entered Indonesia directly from continental Southeast Asia and share the major characteristics of certain ancient peoples in that locality. Like most, if not all aboriginal Americans, the Northwest Coast tribes also descended from immigrants leaking across from the east coast of Asia. It even seems to be fairly well established that the stock to which the Northwest Coast tribes belong represents one of the last migrations into the New World. A number of non-Malay features among the Northwest Coast tribes may have been acquired locally or in the period of migration; at any rate they represent no isolated problem insofar as they are all found sporadically in various parts of the New World. (Boas 1925, p. 22.) The problem of origins is thus in its full extent limited to the third and youngest member of this Pacific triangle, the oceanic tribes that have ended up as discoverers and settlers of Polynesia. Since this branch in no way resembles its distant relatives in the Malay corner, but shares to an extraordinary degree all the main physical peculiarities of the Northwest Indian tribes, I see no reason, from the standpoint of physical anthropology, why the last continental stepping stone of the Maori-Polynesian mariners cannot have been somewhere inside the archipelago off the Northwest American coast.

Mental traits

Too little is known about the development and inheritance of mental traits to use them as an argument for racial kinship. Yet, the very noticeable temperamental distinction between the morose and reserved Malays and the laughter-loving and eloquent Polynesians also applies to the aborigines of Northwest America. For, in passing, we may point out that one who is familiar with the characteristic atmosphere of a Polynesian settlement can hardly avoid a feeling of familiarity on entering a Kwakiutl or Bella Coola community on the Northwest Coast.

The following description by Niblack (1888) of the mental qualities of Northwest Indians might as well have passed for the Polynesian islanders: "One sees many strikingly intelligent and attractive faces amongst the older men and women... They acquire knowledge readily... They are quite ingenious... They possess a fair knowledge of human nature; have good oratorical powers; are communicative when diplomatically approached; have a keen sense and appreciation of the grotesque; and have a great sense of wit and humour."

Northwest American-Polynesian agreement in cultural level

If the Maori-Polynesians had their ancestors among the Northwest Coast tribes, they may well have remained a neolithic people up to the recent time when they spread into their present habitat. Except that some Northwest Indian tribes had commenced to hammer certain copper shields for ceremonial and ornamental purpose, none of them had passed the polished stone age even at the time of European discovery. Like their cousins in Polynesia, these people were making their clubs of stone and whale-bone, and shaping their adzes of polished stone, right up to the time when their neolithic cultural level was disturbed by the arrival of our own race in post-Columbian time.[1]

If the Maori-Polynesians originated in this same Northwest American habitat, this will also explain at once why no Maori-Polynesian tribe could manufacture pottery. Pottery was entirely unknown among all the Northwest Indian tribes until Europeans arrived. It was indeed known and manufactured among all major branches of mankind living round the Pacific, except just among the Northwest Indians, their nearest American neighbours along the adjacent Pacific coast, and the Indians along the southern tip of South America.

The local absence of the loom on the Northwest Coast also made Kwakiutl and other Northwest Indian tribes maintain the custom of beating the inner bark from trees, like so many other American tribes. If the Polynesians sailed from this area, no further explanation would be needed of their having arrived without knowledge of the loom.

We shall see how, one by one, the previous puzzles find their simple and quite natural explanation, once we abandon the theory of an eastward spread by way of the Malay Archipelago and transfer our attention instead to the possibility of a Maori-Polynesian spread by way of the Northwest American coast.

Speculative theories concerning the nature of Captain Cook's influence upon primitive cultures

If the Polynesians arrived by way of the Northwest Coast Archipelago their chronology would be on a safe footing, and we should be in a full agreement on the cultural level before entering upon a more specific comparative study of ethnological elements and other controllable data. We shall first, however, have to face an argument that has been produced in an effort to belittle the value of analogies between Northwest Americans and Polynesians: that culture elements and artifacts on the Northwest American coast, resembling corresponding objects known throughout Polynesia, may have been brought to the Northwest

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[1] As Cook (1784, Vol. II, p. 334) and the other European discoverers of the Northwest Coast archipelago noted, the few pieces of iron found in the hands of the natives were of distinctly European make, and had been acquired through inter-tribal barter with surrounding Indians who had already been in indirect contact with Europeans.

Indians only after the Europeans arrived, since the early English ships that visited this archipelago came on directly from nearby Hawaii. When the present author was interrupted in his work among the Northwest Indians by the spread of the Second World War, his attempt to call attention to the possibility of the suggested migration was publicly denounced by a prominent sociologist, who held that Captain Cook and subsequent travellers might well have purchased a number of utensils in Polynesia, and then have left them behind among the Northwest Indians.[1]

Captain Cook and subsequent voyagers might very well thus have transferred a few objects, although they make no mention of it in their journals. The only entry we find is that in which Cook especially stresses that iron was the only article of trade that had any effect at all on the Northwest Indian tribes: first nails, then axes, pots and pans, brass buttons, and various scrap metals or moulded objects. These are just what Cook could not have brought from Polynesia. Obviously, if Cook's men had brought a curiosity such as a Polynesian club or stone adze, such a primitive object would have had more value to them than to the Northwest Indians. Upon contact with white men the Northwest Indians threw away their own stone adzes and at once began to make tools of iron. Certainly, Cook had a Polynesian interpreter among his crew, but this interpreter did not walk about equipped with the culture elements of a stone age man; nor would a group of his kindred be able to remove the loom and pottery and set a lasting stamp on the physical appearance and material culture of the whole of the Pacific Northwest coast.

The preconceived attitude on which such speculations are based is best seen when we consider that Cook is never suspected of leaving Polynesian culture elements anywhere outside the Northwest American coast, say in Indonesia; and that he was himself surprised at finding the similarities for which he and subsequent Englishmen have later been declared responsible. As Dixon (1933, p. 315) states:

"Several of the earlier English explorers of the northwest coast of America, like Cook and Vancouver, who had previously been engaged in exploration in the South Seas, were much struck on coming in contact with the Indians in this region by the similarities between some features of their culture and those of the Maori of New Zealand. The solidly constructed plank-houses with their elaborately carved and painted decorations, the forts, the finely woven mantles, the short bone and stone clubs, recalled to their minds similar objects among the Maori and led them to speculate as to the possibility of some relationship between the two groups of people."

This indeed, is enough to clear Cook and the early Europeans of the responsibility for these ethnological similarities between two neolithic peoples.

Evolution of a maritime culture and the deep sea canoe in Northwest America

If we now look for the particular culture element that has the most direct bearing upon the problem of Polynesian migrations, our first thought will naturally concern the vessel in which the oceanic journey could have been made. Was there, within Northwest Coast territory, any type of deep-sea craft that could make such voyage? If so, is there still today any similarity between the craft used by the local Indians and those used in Polynesia?

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[1] Mead in Canadian Press; New York, April 2, 1940.

The answer may be given in the affirmative. We shall later deal with divergent types of craft inside the historically known Maori-Polynesian island world, but at present it will suffice to point out that a sea-going canoe, often of enormous size, was the craft used for fishing and voyaging among the great majority of Polynesian tribes, as well as among their semi-continental neighbours of the Northwest Coast Archipelago. The similarity of these craft has been apparent enough to encourage speculations as to whether prehistoric Polynesians with these canoes, could have settled among their Northwest Indian neighbours; but such a speculation only leave us with three problems instead of *none*, namely: (1) The Northwest Indian culture was based on seafaring and fishing, so what became of the original and indigenous local craft if the historically known Northwest Coast canoe were only borrowed from Polynesia? (2) Where outside Polynesia do we find a neolithic seagoing canoe similar enough to the Polynesian form to satisfy the requirements of the prototype form that once enabled the Polynesians to push into the open Pacific? (3) Why was the Melanesian-Polynesian outrigger not brought to Northwest America by the alleged oceanic intruders?

As a matter of necessity, deep sea prototypes of the Polynesian craft must have originated outside Polynesia; how else could their masters have reached that oceanic area? While the Polynesian canoe must necessarily have been imported into the Polynesian islands as a fully developed deep sea craft, we shall see that the Northwest Indian canoe has undergone considerable evolution within the Northwest Coast Archipelago, and had only reached its final highly developed form after prolonged local evolution from a more primitive form.

We have already shown with Goddard (1924) that, due to geographical conditions, "the Northwest-coast of America is exceedingly favourable for the development of a culture which depends almost entirely upon canoes for travel and transportation, and upon the sea for its supply of food."

In his archaeological survey of ancient Coast Tsimsyan and Kwakiutl village middens, Drucker (1943, pp. 30, 110) was the first to demonstrate that the local cultures had been maritime right back through their prehistoric period. Presenting the results of his survey, he writes: "First of all, it is apparent that the habitation sites (middens) are nearly all at the water's edge, indicating that substantially the same subsistence and transportation patterns as those in vogue in the historic period have prevailed throughout the period represented by the accumulations. This interpretation is substantiated by the fact that the prime requisite of an important site was clearly a good beach where one might land at any stage of the tide; shelter from storms, defence, and the like, were far less important, although native legends speak of refuge sites occupied in time of war. From the time of first occupancy of the sites, good landing places were sought, and ipso facto canoe navigation and all that it signifies in recent native life and economy was an integral part of the culture. The great number of sites in the area bears out the same interpretation." And: "Thus it was that the people lived at the water's edge, derived most of their livelihood from the water, travelled waterways in preference to trails, and regulated their activities by the tides quite as much as by daylight and dark."

Martin, Quimby, and Collier (1947, p. 462) also mention "the shell middens of great extent and thickness" found in the Northwest Indian habitat, and state that: "Excavations in a few of these remains have indicated that the prehistoric inhabitants, like the historic

Indians, were a maritime people who built their villages of wooden houses close to the shores, travelled by canoe, and subsisted primarily on the products of the sea."

In his detailed study of the Northwest Indian canoe, Olson (1927—29) shows how three major types have been developed to their present form, all within the Northwest Coast Archipelago. This local American development is in all probability fundamentally based on the early type of craft that brought the ancestors of these coast Indians to their present habitat, and may, Olson suggests, be historically related to the dug-out boats of Northeastern Asia. He goes on to show how the Nootka, Kwakiutl, and Haida Indians bore the greater part in the development of the nuclear coast culture, and he attributes to them the main evolution of the real deep sea craft. Since these tribes for the most part occupy the islands off the mainland, he finds that "all three of these tribes are so situated that without ocean-going canoes many features of their cultures would be impossible."

Outside this nuclear area, features appear showing that the action of the cultural process is not restricted to the cultural centre. The great variety of canoe forms discoverable from the Puget Sound to the Alaskan coast clearly indicates an early origin and a considerable evolutionary and differentiating process. Olson's entire study goes to show how these ocean-going craft of the Nootka, Kwakiutl, and Haida, in time were developed from primitive forms to their present elaborate shape within the Northwest Coast Archipelago.

The result was a craft which stands as the principal culture element possessed by the Northwest Indian tribes, or as Niblack (1888) expressed it: "The canoe is to the Northwest coast what the camel is to the desert. It is to the Indian of this region what the horse is to the Arab. It is the apple of his eye and the object of his solicitous attention and affection. It reaches its highest development in the world among the Haida of Queen Charlotte Islands."

Holmes (1919, p. 119) says about the same cultural product of these Northwest Indian islanders: "The dugout canoes are often of great size, beauty, and seaworthiness, and are probably the world's highest achievement in this direction."

And J. M. Brown (1927, Vol. II, p. 68): "Their canoes are large and roomy, capable of accomodating scores of men; they are made with great skill and artistic talent; they are of all primitive craft the most fitted for meeting the conditions of oceanic voyaging, and have a great resemblance to the Maori war canoe..."

The special conformity between the Northwest Indians and the Maori

To the Maori and his New Zealand culture, probably more than to any other Polynesian tribe, have been attributed, since the time of discovery, striking similarities to the Northwest American Indians. The absence of the outrigger among the Maori is perhaps one apparent reason why their craft resemble the Northwest Indian canoes more than do those of nuclear Polynesia. In this respect the Maori form, through early isolation from Melanesian and Micronesian influences, would tend to be the closest approximation to the early prototype of Maori-Polynesian craft. As nobody could visualize Maori canoes sailing from New Zealand up past Hawaii, to settle the Northwest Coast, (a journey almost all of which would be against the prevailing north-easterly trade winds) the observation of Maori-Northwest Indian analogies has led to other theories and comments. Commonly, they are presented as mere noteworthy facts that require a further investigation, but they have also been produced to demonstrate how a similarity of climate and environment can develop a similarity in race and culture. (Niblack, 1888.)

Unquestionably, natural conditions in New Zealand and British Columbia are similar, but so are they in Tahiti and Cuba, with no corresponding effect. Naturally, settlers in the cooler climate of New Zealand would be likely to preserve a Northwest Indian type of clothing and dwelling to a greater perfection than would descendants of Northwest Indian settlers on the tropical islands of Polynesia. But this would not imply that everybody with a similar climate would naturally dress in the same manner and fashion, or build their dwellings in the same style. Certainly it would not encourage their use of a similar spatular weapon or a convergence in physical norms. It has been said that the Maoris might have abandoned the use of the outrigger because it was not suited to their own rocky coast. Yet the outrigger is highly suitable all around the Marquesas Islands, which have no reefs, but precisely the same open mountain coast as New Zealand. And the present author has with excellent results attached Polynesian outriggers even to local craft in Canadian waters.

The primary object of lashing an outrigger to a narrow craft is to prevent it from capsizing, and, on smaller canoes, even to smooth off chopped wind-waves that would otherwise enter the vessel. On the huge deep sea canoes the beneficial effect of an outrigger may be acquired simply by lashing two canoes parallel to each other a little distance apart. This indeed, was the *tau-rua* type of craft which, according to all Maori traditions, brought their forefathers over the sea to New Zealand. Such double canoes were in frequent use in many parts of Polynesia.

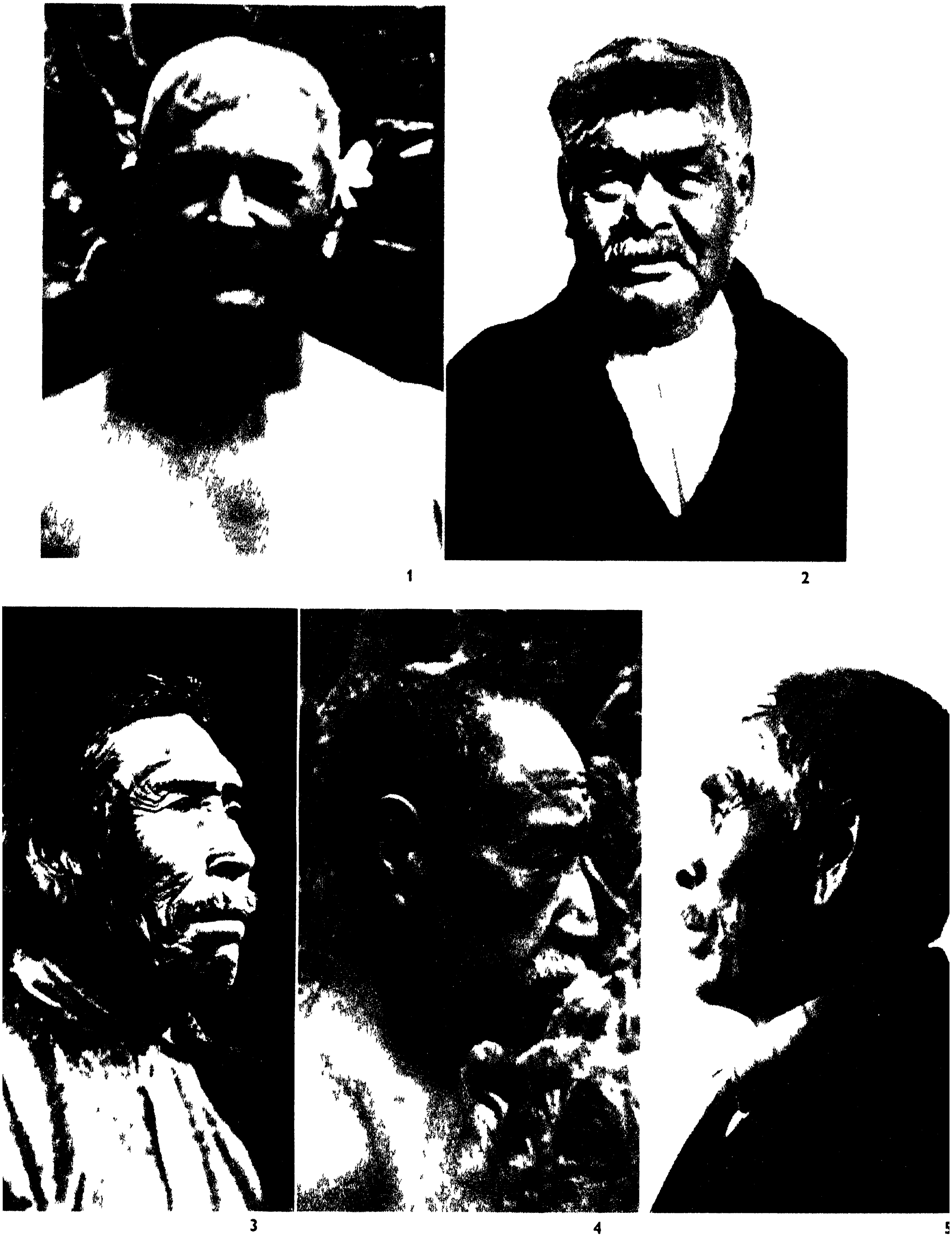
The double canoe

As has been illustrated by Hornell (1943, pp. 92, 94), the contrast in the Indonesian and Polynesian ideas of adapting a craft for the sea is very marked. The Javanese believed in developing the dimensions of the hull to resist the action of the high sea, and so built their large two-masted sailing-ships, steered by rudder and with large and massive double outriggers of complex design. Such a craft had a great capacity for carrying trade in Indonesian waters, but was stiff and clumsy and little suited for ocean voyaging. The Polynesian islanders, however, developed no spacious form of ship, but constructed their small craft on the principles that they should follow—and not resist—the towering ocean seas. They resorted as an alternative to the well-balanced double canoe for real ocean voyaging, making their craft adaptable to the motions of the unsheltered water, and securing toughness and flexibility by always using roots and ropes for lashing, instead of nails or wooden pegs.

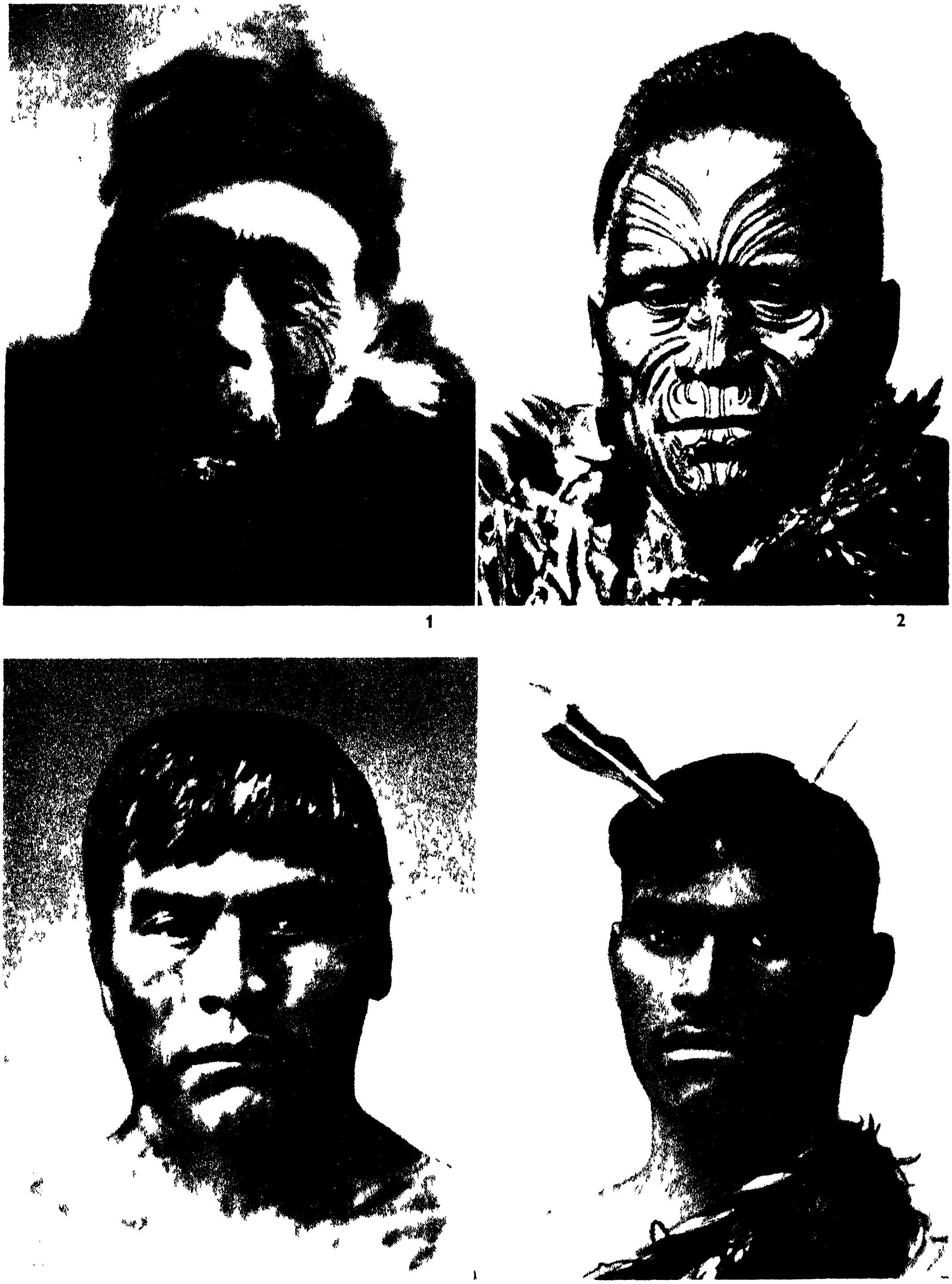
The Polynesians nearest to Melanesia had developed locally a form of craft intermediate between a Polynesian double canoe and a Melanesian single canoe with outrigger. The two united hulls in these local double canoes differed markedly in size, the smaller one actually being nothing more than a large boat-shaped outrigger. While this highly specialized border-line craft was a permanent construction, on the other islands the double canoe was more often a temporary arrangement, generally improvised when long oversea expeditions were organized. Thus, from Hawaii in the north to the Marquesas, the Society

Bark cloth and bark beaters from Celebes and Mexico. The common argument that bark cloth manufacture could only have spread to Polynesia from Celebes is not conclusive, since the same culture traits were widespread also in aboriginal America. (Photo: *Amer. Mus. Nat. Hist.*)

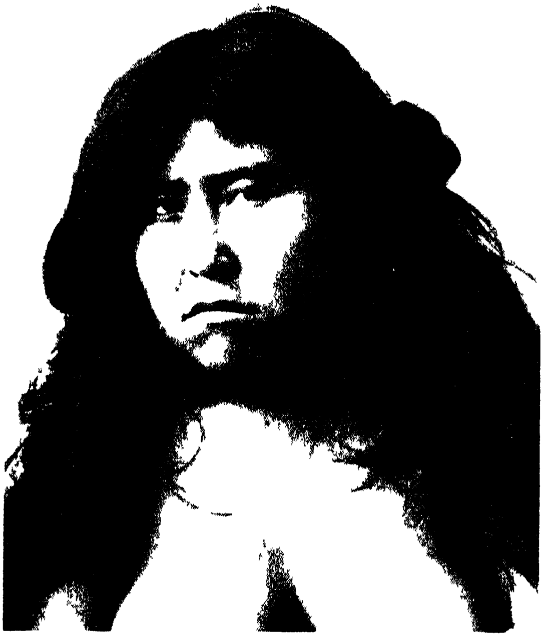
Physical types from Northwest America. Kwakiutl Islander and wife from Quatsino Sound, Vancouver Island, Br. Columbia. (Photo: *B. W. Leeson.*)



Polynesian and Northwest Indian types. **1** Chief Terriieroo of Tahiti. (Photo: *T. Heyerdahl.*) **2** Kwakiutl Indian from Bella Bella. (Photo: *R. Ruggles Gates.*) **3** Chief Cas-e-lus, Kwakiutl legend bearer and public orator, Quatsino Sound. (Photo: *B. W. Leeson.*) **4** Chief Tei Tetua, Fatuhiva Island, Marquesas. (Photo: *T. Heyerdahl.*) **5** Tlingit war chief from Sitka. (Photo: *Amer. Mus. Nat. Hist.*)



Polynesian and Northwest Indian types. **1** Kwakiutl Islander, Quatsino Sound. (Photo: *B. W. Leeson.*) **2** Maori chief, New Zealand. (Photo: *J. Martin.*) **3** Young man of Nitinat tribe, Br. Columbia. (Photo: *Amer. Mus. Nat. Hist.*) **4** Maori youth, New Zealand. (From Hutchinson *et. al.* 1906.)



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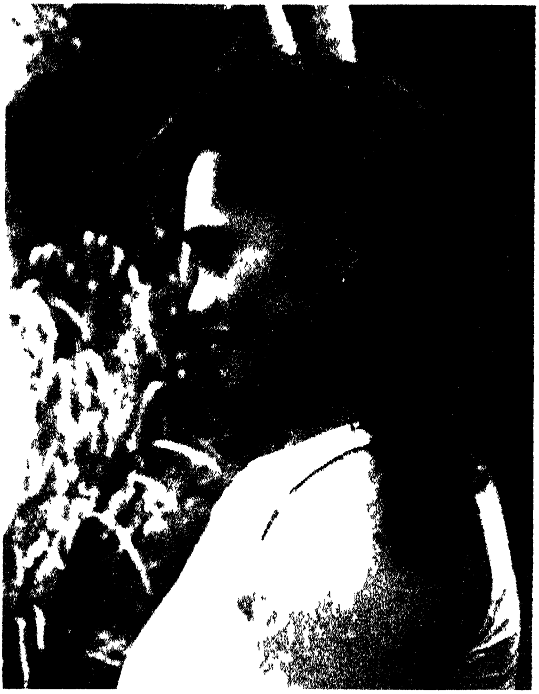

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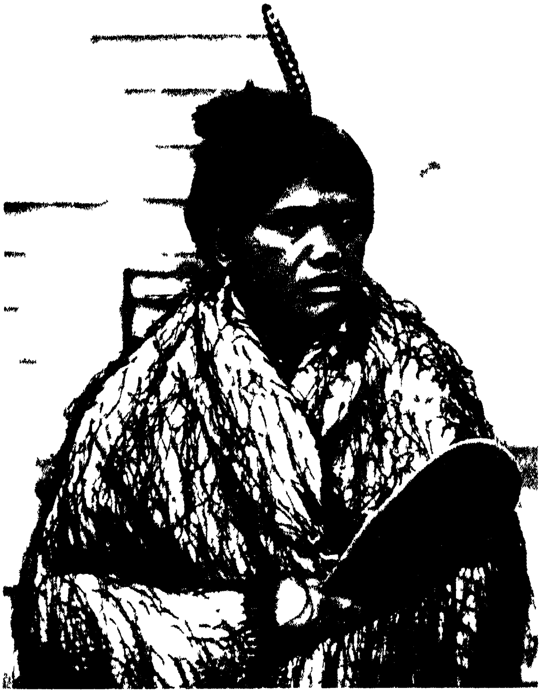

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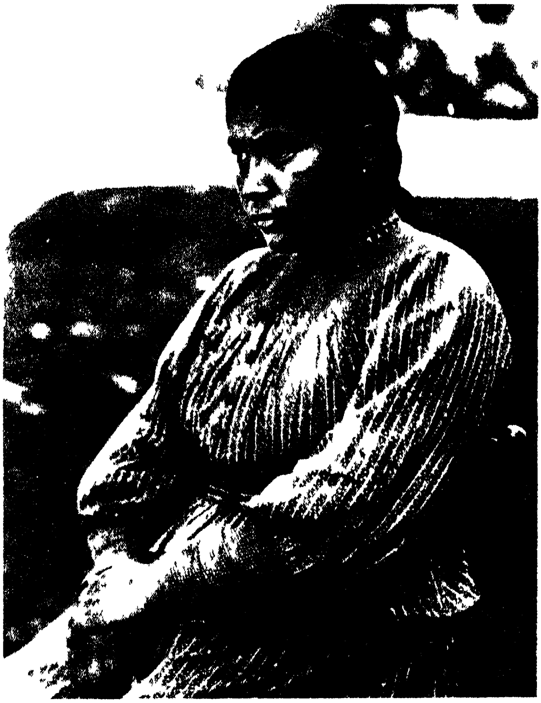

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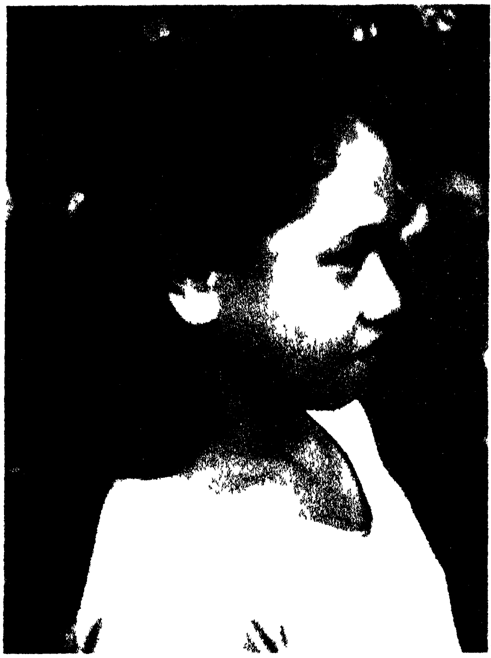
1 Stick Indian girl from Copper River, Alaska. (Photo: *Amer. Mus. Nat. Hist.*) **2** Polynesian girl from Fatuhiva, Marquesas. (Photo: *T. Heyerdahl.*) **3** Maori youth, New Zealand. (Photo: *Dominion Mus., Wellington.*) **4** Girl of Douglas Tribe, Br. Columbia. (Photo: *Amer. Mus. Nat. Hist.*)



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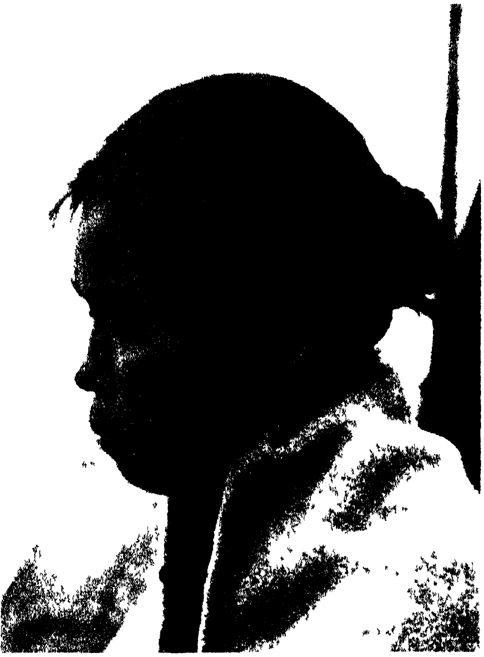

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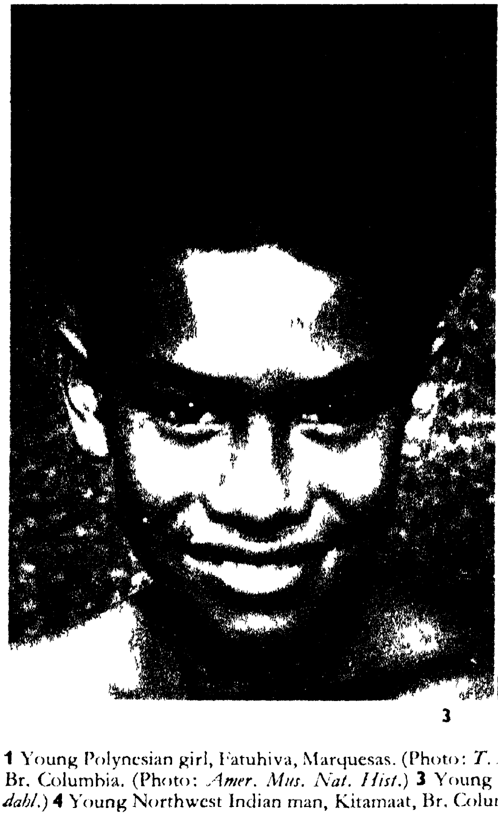

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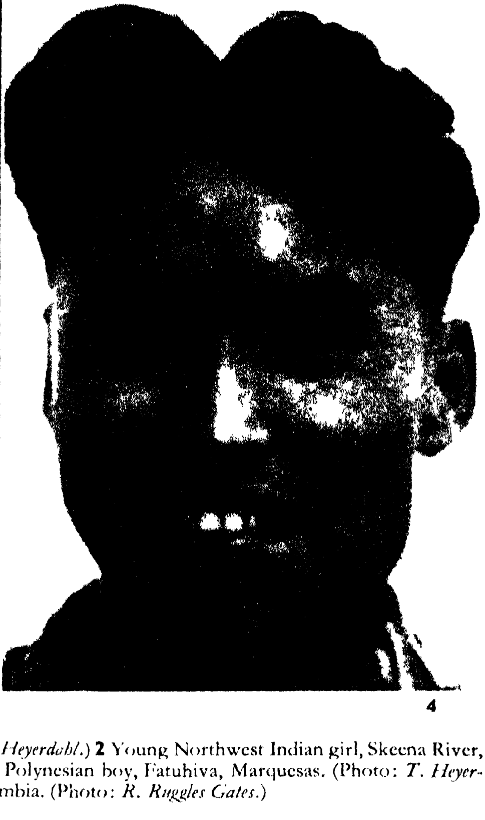

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1 Young Polynesian girl, Fatuhiva, Marquesas. (Photo: *T. Heyerdahl.*) **2** Young Northwest Indian girl, Skeena River, Br. Columbia. (Photo: *Amer. Mus. Nat. Hist.*) **3** Young Polynesian boy, Fatuhiva, Marquesas. (Photo: *T. Heyerdahl.*) **4** Young Northwest Indian man, Kitamaat, Br. Columbia. (Photo: *R. Ruggles Gates.*)

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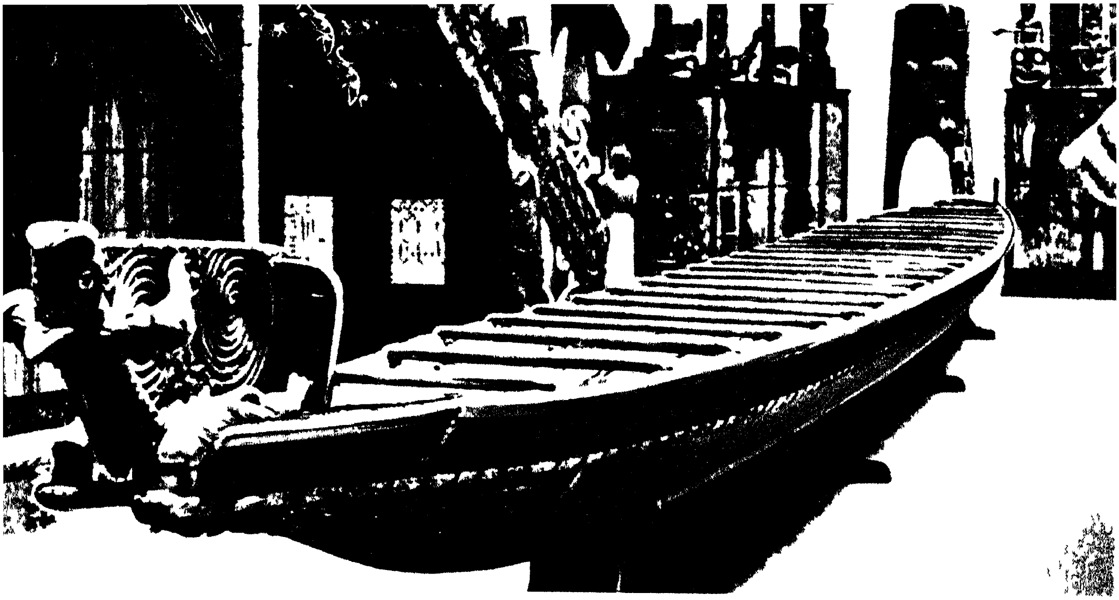
1 and **2** Kwakiutl public orators with ceremonial Potlatch badges. (Photo 1: *Amer. Mus. Nat. Hist.*; 2: *B. W. Leeson.*) **3** A Maori mother with child, New Zealand. (Photo: *J. Martin.*) **4** Northwest Indian youth during dance, Br. Columbia. (Photo: *Amer. Mus. Nat. Hist.*)



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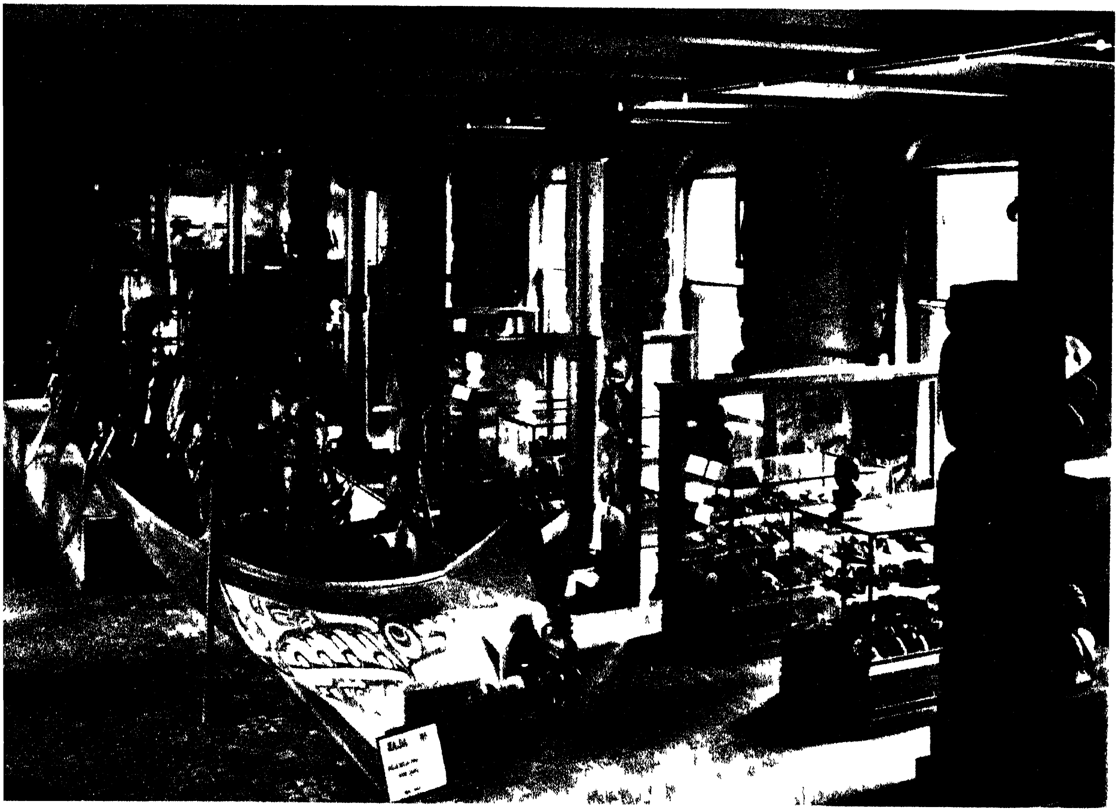

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1 Maori war canoe in Auckland Museum, surrounded by samples of Maori wood-carving art. (From: *Best 1925* a.)
2 Haida war canoe in American Museum of Natural History, surrounded by samples of Northwest Indian wood-carving art. (Photo: *Amer. Mus. Nat. Hist.*) Note zoomorphic figure carved in bow, and painted device placed immediately underneath same.

Islands and New Zealand, the double canoe consisted of two ordinary canoes of equal size, only temporarily connected and occasionally covered with a plank deck.

It is obvious that the peculiar western Polynesian canoe above referred to is either developed from an outrigger canoe inspired by the idea of a double canoe, or from a double canoe inspired by the idea of an outrigger. The latter seems more likely, since the small side canoe is obviously constructed to serve as a stabilizer and not intended to carry people. From a practical point of view the intention of an outrigger seems to be a greater achievement—and one more difficult to conceive—than the idea that two rank canoes in a heavy sea may benefit one from the other by being temporarily united side by side. The step from this simple observation to the deliberate use of double-canoes in oversea voyaging is not very far. But as Archey (1937) writes: "It is still a matter for discussion among ethnologists as to whether the double canoe or the single canoe with outrigger was first thought of."

The question may be disputed in Polynesia proper, where both forms were already known and used at the time of European discovery; but, as we have seen, there is not much choice when we turn also to New Zealand, where the outrigger only gradually became known with European voyagers from the tropical islands, whereas double as well as plain single canoes were in current use. The Maori is an average representative of the former Central Polynesian, well preserved through effective local isolation.

Best (1925 a) gives the following traditional account, well known among the Maoris, of the main fleet of canoes that brought their forefathers to New Zealand a few generations before the time of Columbus: "Taiaroa's fleet, which consisted of twenty-nine canoes, was mainly composed of vessels specially adapted for ocean voyaging, formed by lashing two ordinary war-canoes together, and further strengthening them with a deck."

The Maori reference to the ancestral use of this known Polynesian type of craft at the early period of migration, is interesting in view of the following conformity observed by Schurtz (1895, p. 43): "Traditions of vessels lashed together have persisted in New Zealand as well as in Northwest America, in the latter area even among the Tinneh tribes of the interior."

In his work on the Northwest Indian canoe, Olson (1927—29) speaks of the earlier local "practice of lashing two canoes together and placing a platform of planks across the two," and he shows that the origin of this Northwest Indian custom may be found in similar practices with the inferior boats of the Yukaghirs and Koryaks of Northeastern Asia.

Among the widespread Northwest American tribes with traditions of a former use of double canoes for ocean travel, are the Haida and Tsimsyan on the Pacific coast, and even some of the distantly related Athapascans of the interior plateau. Thus the Tsimsyan Salmon-Eater tribe of the Nass and Skeena Rivers have preserved a tradition describing in some detail a local sea-voyage in connection with the disastrous wedding of a princess named Dzelarhons, who was remembered as the first female progenitor of their nation. Of special interest in the present connection is the following strophe, since it has a bearing on their early local modes of travelling: "Dzelarhons was seated by the messengers on boards laid across the top of twin canoes and brought under sail to the home of the suitor's uncle."

Barbeau (1945, pp. 427, 432) presents this interesting piece of traditional information in his attempt to show the original extra-American affiliations of Dzelarhons and her

Salmon-Eater tribe, as this mode of voyaging was not commonly practised in the New World. He writes: "The boards laid for Dzelarhons across the tops of the two canoes tied together remind us of the double dugouts or skin boats lashed together side by side. These double canoes are unknown on this side of Bering Sea except in the traditions of the northwestern tribes originally from Asia and among some Eskimos also from Asia, but they are typical of the South Seas and the coast of China. Salmon-Eater and his tribe, by using a double canoe at their first wedding ceremony in Alaska, begin to unfold for us a story of remote cultural affiliations. Who was Salmon-Eater? A Kurile Islander, or a sea hunter from still farther afield, down the Asiatic coast?"

The sail, and the marked distinction between a sail and sailing-boat

Barbeau refers to another interesting passage in this ancient Salmon-Eater tradition (*Ibid.*, p. 429): "The princess sat entranced near the canoes, gazing out to sea. A long way off, she beheld an *ahlarom-skanæ*, a sail made of matting. A canoe carrying six hunters came out of the sea; . . ." This party belonged to a neighbouring sea-coast tribe, into which the princess married to safeguard the name and patrimony of her own ancestors who had come out of the 'foam' of the sea, but were killed in a local disaster.

No true sail was known to the southward along this coast, so an early description of a local sail made of matting is interesting. From the information of a few old chiefs who still were familiar with the ancient *adaorh*, Barbeau inferred that the sail in question was made "of weeds or sea grass".

We are here confronted with another remarkable parallel between early Northwest Indian and Maori navigation. Neither of these outstanding maritime cultures had anything but the most inadequate knowledge of the use of sail. It has in some quarters even been doubted whether any Indians in North America knew the use of sails before the arrival of white men. In view of traditional evidence and the type of sails seen and collected among Northwest Indians, this claim is not well founded. We may restrict ourselves to saying there was in North America no local sailing craft before Columbus; that is, no craft fitted and designed for pure sailing purposes. The invention of a craft that can turn under sail and go anywhere in any wind is an advanced art that would not naturally come to any primitive mariner. But modern man under-estimates unreasonably the ingenuity of the so-called 'savages' if he assumes that the constantly seafaring Haida and his neighbours could not discover the direct one-way effect of the wind upon his craft until told about it by the white men. A nation of whom Bancroft (1875, Vol. I, p. 158) wrote: "Swollen and deformed legs are common from constantly doubling them under the body while sitting in the canoe," could hardly fail to detect that a standing man, an outspread cloak, or anything catching the wind, would create a drift and speed the boat's progress in the direction of the wind. The *ahlarom-skanæ*, or matting sail, of the Salmon-Eaters is not a mere culture element of local tradition; it has been seen and collected among the aboriginal Northwest Indian mariners, although it was long ago discarded in favour of European types of sail. These native sails were constructed on different principals from those of European sailing ships, could only be used when the voyager was to travel in the same direction as the wind, and were thus not a permanent erection with fixed masts.

In his informative handbook on the Indians in question, Goddard (1924) remarks:

"Canoes were also sometimes sailed, perhaps even before the coast was visited by Europeans. These sails were made either of wood or of matting. A wooden specimen in the Museum is about 9 feet square and 5/8 of an inch thick, made of several pieces joined by sewing with spruce root. To prevent splitting, the ends of the sail are reinforced by strips with the grain running in the other direction. Such sails were employed particularly when two canoes were lashed together and covered with house planks. If the wind were from the stern the sail was leaned up against a pile of boxes, or possibly against a short mast, and the canoes were driven before the wind. Mats were also employed with a mast and a yard."

The only effect of the arrival of our own civilization among the Northwest Indians was that the manufacture of such skilfully made but impracticable wind-catchers, like the perfectly designed seagoing canoes on which they were used, were soon abandoned and entirely displaced by European rowing-boats and true sailing craft.

Turning now to the Maori of New Zealand, Best (1925 a, p. 180) presents some interesting details in his monograph *The Maori Canoe*. He quotes Banks, who wrote about the Maori: "In sailing they are not so expert; we very seldom saw them make use of sails—and, indeed, never, unless they were to go right before the wind. They were made of a mat, and instead of a mast were hoisted upon two sticks, which were fastened one to each side, so that they required two ropes, which answered the purpose of sheets, and were fastened to the tops of these sticks. In this clumsy manner they sailed with a good deal of swiftness, ...the masts were not permanent erections: the sails were attached to the masts and the two raised together."

Similarly, he shows how Polack observed sails among the Maori which were "formed of bulrushes dried in the sun and tacked together...". He stated that they were "the most clumsy and heavy articles that could have been invented." The same early eyewitness (Polack 1838, Vol. II, p. 22) speaks of the size and construction of the wonderful Maori canoes that could carry one hundred men, yet he adds: "Canoes in sailing are only capable of going before the wind; the natives do not understand any other method, and the little hold these vessels have in the water would render all further knowledge useless."

Has it ever occurred to anyone that this is the sailing tackle with which the Maori are supposed to have forced their way some 5,000 miles against the strong trade wind, from Malaysia to the opposite side of New Guinea, Melanesia and Australia? Without keel, fixed mast, and the highest standards of sail and rigging it is only natural that the Maori navigators never hoisted sail unless they were to go before the wind. With a heavy bulrush mat hoisted upon two sticks nobody can achieve miracles in the way of sailing, and no wonder the Maori themselves give another version of their original sailing directions, which, contrary to the headwind theory, brought them as discoverers to New Zealand with the northeasterly trade wind right at their backs. Maori traditions claim that their ancestors arrived by way of Rarotonga, a fact now generally accepted by ethnologists, since the Rarotongans quite independently gave the same information, remembering in their sacred traditions even some of the same names which the Maori gave to the canoes of their famous ancestral fleet. (Buck 1929, p. 13.) Rarotonga could in turn easily be reached with the same wind from Hawaii, and the chain of Hawaiian islands is located just where the northeasterly trade winds, accompanied by a Northwest American current, bear down from an area just off the Northwest Indian habitat.

The origin and existence of better types of sail in Polynesia proper will be dealt with in a later chapter.[1] So far we have only shown that Maori tribes, descended from pure representatives of the newly arrived Central Polynesian mariners as these were in the thirteenth and fourteenth centuries, had an excellent sea-going type of craft consisting of two canoes lashed together, without outrigger and without any other sail than a clumsy mat that could only be put up with a stern wind. Indeed, by removing the sail they, like the Northwest Indians, could force their way manually by paddling to a fixed destination. But this is not the manner in which a neolithic people "pushes" on exploratory voyages into and across vast distances of unknown ocean. Once an island behind them is known, they may certainly force their way back to it even in head wind, with their paddles, but such is not a voyage of primeval discovery, not even among historic peoples who have had better sailing tackle than a mat on two sticks.

The deep-sea canoes of Northwest America and Polynesia

So far we have simply spoken of the canoes as "single" or "double". We shall now examine the main craft itself, the actual canoe, and see if the many diverging types found within historically known Polynesia share any common basic characteristics which again may be traceable to Northwest America.

To compare the general process of boat-construction within these two geographically adjacent ethnographic areas, we shall follow the various phases right from the beginning of the carpenter's work.

Working procedure on the hull

When the Northwest Indian decided to fell one of his giant trees to make a capacious canoe, he first performed a ceremony, making a sincere apology to the tree and explaining to it his compelling need. A quite similar ceremony of excuse, occasionally with the sacrifice of a small pig, was performed in Polynesia also, right from Hawaii to New Zealand. (Henriques 1925; Eliott 1939.)

This performance over, the tree was felled, in the same way in both areas, by using a hatchet-shaped adze instead of an axe. The chopping was thus done with horizontal blows, making the cutting edge of the stone blade penetrate the wood parallel with the grain of the wood, instead of crosswise on the grain with an axe as is usual with most peoples. Commonly, when the chopping had been carried on a little way right round the tree, a fire was kindled inside the groove to carry on the process, and the fire was generally regulated by a plastering of wet clay. (Turner, 1861; Best, 1925 a.) Old stumps of huge trees felled in this manner may still be seen in Bella Coola Valley, British Columbia.

When the tree was felled, the aborigines of both regions first split their colossal timber lengthwise along the middle, by using wooden wedges with tough bark tied round the upper part. The wedges were driven in by a wooden beetle, or more often by a stone sledge-hammer. About the latter Jacobsen (1891, p. 162) wrote: "We find particularly two types of stone hammers among the utensils, which both show the same form in Northwest America as for instance in Hawaii, Tonga, the Marquesas, and the Ellice Islands in Polynesia and in Melanesia. The first type resembles the head of the cachelot, the second is cylindric and ends on one side in a round knob [*eine Glocke*]. Both the forms are characteristic of the aforesaid territories, and we do not find them in any other part of the world. They are generally used to drive in the great bone-wedges during wood-splitting. They are also used to strike at the chisel during the carving of the houses and canoes."

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[1] An ancient finger-woven Maori sail of interesting design has found its way to the British Museum and is described by Firth (1931), but it is a collector's piece of unknown origin and its pre-European construction is not verified.

When the colossal log was thus split lengthwise, the largest and best half was hollowed out by means of a chisel or a stone adze, and sometimes again both peoples used fire to char the inner part to ease the carving. (Dreyer 1898; Best 1925 a.)

When the hull was hollowed out, within both areas slaves with bark ropes were used to pull the enormous canoe out of the forest and down to the seaboard village.

Both in Northwest America and in Polynesia the size of the canoe would vary greatly according to its intended use. Dreyer (1898, p. 137) says about those of the Northwest American coast: "These craft can be as much as 70 feet long by 6½ feet broad and 4½ feet deep, accommodating up to a hundred persons..."

Best (1925 a) quotes Crozet concerning the canoes of early New Zealand: "I measured one of them which was 70 feet long by 6 feet broad and 4 feet deep, made of the body of a single tree-trunk, the two sides of which were raised of planks skilfully sewn on..."

The sewing of wood

The fact that the Maori never resorted to any form of overlapping and nailing in their boat construction, not even with available hardwood pegs, has already been commented upon. Like all Polynesians, the separate pieces of wood required in the canoe were invariably fastened together by butting them closely together and sewing one piece to its neighbour with roots and vegetable fibres. This indeed was an ancestral art.

Goddard (1924) says of the canoe of the Northwest Indians: "The stern and bow-pieces and, sometimes even the gunwales, were made of separate pieces, and sewed on."

Expertness in the art of sewing pieces of wood together had attained a high degree of development among all Northwest Indians, and was the standard procedure in the construction of all their large canoes.

Additions to the dugout hull

It is occasionally thought among ethnologists that by counting the number of separate boards added to the dugout hull, a certain inter-island classification of Polynesian canoe-forms may be obtained. We shall see however, that the adding of loose sideplanks is merely a practical question, compelled by necessity, and decided by no other factor than the size of the available trees.

In the Northwest Indian habitat some of the largest known species of giant pine and cedar grew, which provided the local carpenters with almost any size of tree desired for the making of dugout craft. The local canoe-builders were thus free to carve the dugout hull in one piece, and yet obtain the desired depth, which hardly ever was wanted to exceed 4—4½ feet. Unacquainted with oars and rowlocks as the Northwest Indians and Polynesians were, none of these tribes wanted a hull so deep that the whirling of the usual paddles would be impeded. In general, therefore, the Indian on the Northwest Coast had to sew on, as extra pieces, only the raised bow and stern sections and sometimes the gunwales; the addition of extra side planks was usually superfluous. Heizer (1938, p. 215), however, describing the prehistoric plank canoe further south, on the Californian coast, also mentions that "Peña in 1774 saw a canoe with side planks among the Haida of Queen Charlotte Island, British Columbia." Father Peña accompanied Juan Perez from Mexico shortly before Cook and the first Englishmen reached Northwest America from Polynesia. They were the first Europeans known to have met the Haida Indians, who were very friendly and came off in canoes singing and scattering feathers on the water, as their neighbouring tribes did for Cook four years later.

The aboriginal Hawaiians were in the fortunate position, when their own timbers were not of the required size, of having better logs shipped to their shores by the current from Northwestern America. As Hornell (1943, p. 94) shows: "In Hawaii giant logs of Oregon pine occasionally drifted ashore; these were greatly prized, for they were often so large as to serve as entire hulls without the need of raising the sides by means of planks sewn on; the difficulty was to obtain a pair of approximately equal size; sometimes a log was kept for years before this aim was achieved." And (1945, p. 169): "This flotsam from North America was eagerly sought for, and any exceptionally fine tree-trunk was hoarded by the local chief for incorporation in a specially large double canoe. Vancouver (1798, Vol. II, p. 219) records that the chief Taio kept one gigantic trunk unworked for a long time in the hope of finding another to match it. Disappointed in this, eventually, and with great reluctance, he utilized it for the hull of one of the largest outrigger-canoes ever made in the islands."

Apart from this Northwest American drift wood, canoebuilders both in Hawaii and New Zealand still found timber of such dimensions that generally very little, and occasionally nothing at all, had to be added to the sides of the dugout hull. But in Tahiti two or three rows of side planks were needed to convert the hull into a good ocean-going canoe; while in Samoa Turner (1861, p. 266) describes the canoe as consisting of one full length bottom-piece, "and to that they add board after board, not by overlapping and nailing, but by *sewing* each close to its fellow, until they have raised some two, or, it may be, three feet from the ground." On barren Easter Island no tree grew that was large enough to permit even the bottom to be all of one piece, and the rare local canoe had to be sewed together with amazing skill from odd pieces of drift wood.

The making of planks

The making of true planks among people without saws or metal implements is an achievement in itself, and nowhere among neolithic people did this art reach a fuller perfection than among the two East Pacific cultures in question. I have seen a perfectly level hand-split board in an old abandoned Bella Coola Indian house, which was three feet wide, one inch thick, and eight feet long; and Portlock (1789) wrote from the same coast at the time of its discovery: "It is very surprising to see how well they will shape their boards with the shocking tools they employ; some of them being full 10 feet long, 2½ feet broad and not more than an inch thick."

Best (1925 a) quotes Captain Wallis, who wrote from Tahiti twenty years earlier: "The plank of which these vessels are constructed is made by splitting a tree with the grain into as many thin pieces as they can. They first fell the tree with a kind of hatchet or adze, ... it is then cut into such length as required for plank, one end of which is heated until it begins to crack, and then with wedges of hardwood they split it down: some of these plank are 2 ft. broad, and from 15—20 ft. long."

Forster (1777, p. 61) wrote from the same Polynesian island: "When we consider the imperfect tools which these people are possessed of, we can never sufficiently admire the patience and labour with which they have cut down huge trees, dubbed the plank, made them perfectly smooth, and at last brought the unwieldly vessels to the great degree of perfection in which we saw them. A hatchet, or, properly, an adze of stone, a chisel, and a piece of coral are their tools, to which they add the rough skin of a ray, when they smooth and polish their timber."

The bow and the stern

When the hull itself had reached its full size and was completed to the satisfaction of its owner, separate and elevated bow and stern pieces were added to all larger travel and war canoes of the Northwest Indian tribes. The same idea was followed on travel and war canoes of most islands in Polynesia. But beyond this point all inter-island similarity in canoe design among the far-flung Maori-Polynesian tribes seems to end, as the bow and stern pieces vary entirely in shape, dimensions and angle of projection. With such an instability in this particular detail even between the Maori-Polynesians themselves, we can do no more than show that their basic and common ideas are all entirely within the current conceptions of Northwest Indian canoe construction.

A Northwest Coast observer can easily distinguish a Nootka canoe from one constructed by the Haida Indians on the very next islands, just as a Polynesianist can without difficulty tell a Maori canoe from one from Tonga or Tahiti, owing to conspicuous tribal peculiarities in style and decoration. But behind the tribal variation in the respective geographical sections of Polynesia no common basic trait in canoe construction can be found which is not shared also with the nuclear area of the Northwest Indian cultures. We shall illustrate this assertion with a few examples.

Olson (1927—29) in his analysis of the main canoe forms achieved within the continental archipelago of Northwest America, describes the following local specializations: "The Nootka or 'Chinook' type is pointed at both ends, the prow projects upward and forward and, except on small canoes, is a separate piece. The stern is vertical and raised above the level of the gunwales, the upper portion in all larger canoes being a separate piece. The cross-section is angular, the bottom being almost flat.

"The Northern canoe (also called the Queen Charlotte Island and the Tsimshian canoe) is characterized by raised and projecting bow and stern formed of separate pieces, by the vertical cut-water, and by the rounded cross-section. ... A type somewhat akin to both Nootka and Northern forms may have been used to some extent by Haida, Tsimshian, Kwakiutl, and the Coast Salish of southern British Columbia and the Strait of Juan de Fuca. This canoe had elevated and flaring, but not projecting, bow and stern. A few from the southern tribes, however, seem to have had a projecting prow nearly identical with that feature in Nootka canoes."

Best (1925 a) presents the following series of quotations concerning aboriginal canoe forms observed in Polynesia. Of the early Tahitian war canoe Forster said: "The heads and sterns were raised several feet out of the water." And Smith states, from the same island: "The old war-canoe was a very beautiful object: painted red and black, with elegantly carved head and stern pieces..." Crozet wrote, from New Zealand: "These war-canoes have carved and very high poops and prows." Angas only mentions that the elaborate Maori canoes have "elevated stern-posts", whereas Banks tells us that "The head was formed by a plank projecting about 3 feet before the canoe, and on the stern stood another, proportioned to the size of the canoe, from 10 to 18 feet high."

Similar features, with elevated bow and stern pieces sewn on to the canoe, are recorded also from other Polynesian islands. In the Marquesas Islands the bow had a long horizontal projection, sometimes curved slightly upwards and with a head carved on the extremity, the stern being a high upward curving plank. In Hawaii both bow and stern had only a small upturned knob, whereas Tonga and Samoa to the west, as already stated, had developed quite different canoe models, no longer maintaining the elevated or projecting bow and stern.

Additional decorations of canoe

As to the elaborate artistic decoration on some North-west Indian canoes, Bancroft (1875) wrote: "The prow and the stern is raised, and often gracefully curved like a swan's neck with a monster's head at the extremity."

Similarly Ellis (1853) wrote from the Society Islands in Polynesia: "... a rude imitation of the human head, or some other grotesque figure, was carved on the stern of each canoe. The stem, often elevated and curved like the neck of a swan, terminated in the carved figure of a bird's head..."

In a report of the Hawaiian Historical Society (1920, p. 9), the Secretary, after pointing out correspondences between the Northwest Indian and Polynesian wood-carving, adds: "I will mention only one thing more. At Alert Bay [a Kwakiutl settlement] there was a fine long canoe with a builtup prow very much like the New Zealand canoes. A bird guardian was carved on each side of the front of the boat—evidently a transfer of the totem idea of the home on land to the floating home on the sea. Just as the carving on the canoes of the ancient New Zealanders represented legendary heroes in human or animal forms."

Also Niblack (1888), who attributed the Maori-Northwest Indian correspondences to a similarity in climate, said of the Maoris that "they ornament their canoes, paddles, house-fronts, etc. in somewhat the same manner as on the Northwest Coast." He reproduces a Maori paddle in his own series of Northwest Indian paddle types, and says: "Fig. 167 is a New Zealand paddle, introduced by way of showing the similarity of this in connection with the many other objects common to these two remote regions." His own comment is: "The resemblance is marked and interesting."

A most remarkable analogy is to be seen in the fact that to the abalone or ear-shell was attributed magic power, particularly in connection with the sea, among both Northwest Indian and Maori-Polynesian mariners.[1] In both these Pacific areas the artists would occasionally carve this hard shell into squares and circles, and then, in a very artistic manner, insert the pieces with minute accuracy in their wood-carving. The magic power of the abalone shell included divine vision, and to enable a hook to find its fish abalone was occasionally used on fish-hooks in both areas, while in Northwest America even inlaid in the form of an eye. Abalone shell was also often inlaid as eyes of the figure-heads of Maori canoes. (Banks 1896, p. 187; Best 1925 a.)

Painting

In both areas the larger sea-going canoes were painted when finished. The pattern of the painted decoration varied with local art designs, and combined with the artistic adornment in the carving of the sewn on bow and stern pieces to give the respective tribes their own distinct type of canoe. This distinction is as prominent inside Polynesia and Northwest America respectively, as it is if we consider all these tribes jointly. As a general rule it may be said that black and red seem to have been the dominating and conventional colours of ancient war-canoes in both areas. Both Northwest Indian and Maori-Polynesian painters used a regular paint-brush, made of tow or hair tied to a stick; and for grinding the paint-powder they even followed each other in detail in the making of an especial stone mortar and pestle. In both areas red paint was obtained by grinding ochre and mixing the powder with fish-oil; black was obtained in the same manner by grinding charcoal; white from pipe-clay; and other colours of less importance, at least for the canoe-builder, were made from sap and vegetable compounds.

Further comparable data of local craft

None of the deep-sea canoes of the principal Northwest Indian and Maori-Polynesian tribes—often quite enormous vessels—possessed any form of a keel; none of them had any built-in rudder; and none of them had thole-pins or other arrangements on the gunwales that would permit of rowing.

Even in a detail like the carving of a wooden bailer with scoop-like form and short handle, the early Maori followed the canoe-builders of the Northwest Coast.[2] The perforated stone-anchor is also common to the two craft.

The manoeuvring of the craft

Before launching, any large canoe on the Northwest Coast was given its own personal name, and this was also the prevailing custom in Polynesia.

The handling of the craft is described by Lewis and Clarke from the Northwest Coast, and quoted by Bancroft (1875): "When they embark, one Indian sits in the stern, and steers with a paddle, the others kneel in pairs in the bottom of the canoe, and sitting on their heels, paddle over the gunwale next to them. In this way they ride with perfect safety the highest waves, and venture without the least concern in seas where other boats and seamen could not live an instant."

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[1] The abalone shell was found in the high latitudes of the Northwest Indian Archipelago owing solely to the warmth of the Kuroshiwo Current.

[2] A superior Maori-Polynesian form, beautifully ornamented with forward projecting handle, has apparently been developed later. (See Best 1925 a, p. 174.)

Compare Best's (1925 a) description from New Zealand: "The crew on board war-canoes kneel two and two along the bottom, sit on their heels, and wield paddles from four to five feet long; the steersman, sitting in the stern, has a paddle nine feet long. Over tempestuous seas war-canoes ride like seafowl."

We shall mention only one more detail, pertaining to a superstition connected with the landing of these craft. Best (1925 a, p. 173) refers to a rather unpractical custom followed in earlier times among certain Maoris:

"Tuta Nihoniho contributes the following note concerning a custom practised on the east coast: In former times canoes of importance were brought to land stern first, being turned round just before reaching the beach, and backed in: the prow must not strike the beach. This relates to sea-going canoes only. Should the water be too rough near the beach to make the necessary turn, then it is effected out at sea, outside the breakers. It would be most unlucky to run the canoe ashore bow first. River-canoes have no such restriction on them, and if a big sea-canoe be taken into fresh water the rule does not then apply to it. The custom originated, we are informed, far back in the days of Tane and Tangaroa, of Maori myth—the former a land-deity, representing trees (hence a canoe is often styled 'Tane'), the latter a sea-god. . . . The only exception to the above mode of bringing a canoe to land was when a stricken craft arrived with a few survivors on board, having met with some mishap."

The great antiquity of this peculiar Maori superstition is indicated by its association with the Tane myths. We shall soon see (p. 148) that the name and characteristics of this same god reappear in the mythology of the Northwest American coast Indians as a principal ancestral-hero who in the dim past departed from their archipelago into the open Pacific Ocean. We may here only note the following facts about a superstition regarding the method of bringing a canoe to shore on the Northwest American Coast, as preserved in *Haida Texts and Myths* by Swanton (1905): "Canoes were brought to land stern first unless the occupants were in great haste. Among the many things the supernatural beings were supposed to do in an opposite manner from men was to land bow first."

The neolithic elbow adze of Northwest America

With the existence of very similar craft in Northwest America and Polynesia, and the common knowledge of the increasing sea-going possibilities of such giant dugout canoes when two are lashed together and covered by planks, Northwest Indians, as much as their oceanic neighbours, had free access to the open East Pacific on compulsory drifts and intended voyaging. For the time being we shall only bear in mind that the distance from Hawaii to Tahiti or Samoa, so frequently covered by Polynesians in the aboriginal type of craft just spoken of, exactly corresponds to the distance between Hawaii and the Vancouver and Queen Charlotte Islands of the Northwest American waters.

We shall now leave these canoes for the time, and consider another principal culture element among these two adjoining maritime societies—namely the neolithic adze that made such a remarkable evolution in boat-building a reality.

Olson (1927—29), in his study of cultural evolution and differentiation among the various tribes of Northwest Indians, selected for his analysis the canoe, the adze, and the houese-form as the most typical culture elements that distinguish the aborigines of this particular area. The importance of the local adze-form can hardly be over-estimated; it was the carpenter's one indispensable tool, and on its existence were based the boat-construction and all major features of plastic art.

Olson writes about this local tool: "Adzes in themselves constitute a distinctive trait as opposed to the axe, which is used over the greater part of the Americas." He goes on to show that out of a variety of local adze forms the Haida, Tlingit, Tsimsyan, and Kwakiutl had developed the ingenious form generally referred to as the elbow adze. Their various types of perfectly sharpened and highly polished stone blades were fastened to a handle chosen from a forked branch cut in the shape of a long-handled hook. The stone blade was solidly lashed to a small depression on the outer side of the short arm of the hook, with the cutting edge crosswise like a hatchet, in such a manner that it could neither wobble nor wedge back.

Northwards of this nuclear Northwest Indian territory, the simple and ingenious elbow adze gradually disappeared as it was merged into the inferior and yet far more complicated forms of the Eskimo-Aleut area. There a small blade was generally socketed into a head of bone or ivory, which again in turn was secured to a straight handle by lashings passing through a hole near the end of the handle. And southwards as well as eastwards of the Northwest Coast territory, adzes of any form were replaced by the axe. We do not meet with the elbow-adze anywhere down the North American continent until we cross Panama and find a similar hafting in Ecuador and Peru. (Linné 1929, Map. 11.) Olson shows how the particular elbow-adze of the Northwest Indian tribes seems to have developed out of more primitive local D-handled and inverted U-handled forms *specifically inside the nuclear area*, but he still hesitates to claim a local development, solely on the ground of the following obeservation (*Ibid.*, p. 30):

"Its occurrence in Polynesia in a form almost identical with the elbow adze of America suggests a hoary age and extra-American origin."

The possibility of an Old World origin behind the Northwest Indian-Polynesian adze form

Skinner (1931, p. 194), looking for a plausible explanation for certain Northwest Indian-Polynesian affinities which had been pointed out by Imbelloni, says: "That the adzes of the North-west Coast are allied to those of Polynesia through a common ancestor in coastal Eastern Asia is suggested by Olson: ... A similar suggestion for the halibut-hooks of Polynesia is made by Gudger..." Admitting also that certain unusual club forms of the Northwest Indians "do resemble in a remarkable way" corresponding weapons in Polynesia, Skinner adds: "It would seem that this, and numerous other cultural similarities between Oceania and the Northwest Coast, are due to a common cultural ancestor in coastal

Eastern Asia. The Northwest Coast appears to have received these common culture-elements by the coastal route round the north of the Pacific, and not across it."

Skinner's view that such Northwest Indian culture elements as have not been developed locally must have been carried into Northwest America by the coastal route round the North Pacific rather than across it is hardly to be disputed. That the extra-American source of such imported elements would have been the common home of Northwest Indian and Polynesian ancestors in Eastern Asia is also a natural consequence. The only question that has not been asked or answered is: How far did the Northwest Indian and Polynesian ancestors keep company as one branch of humanity before they divided? If we suppose, as is done here, that these ancestral stocks kept company right up to the time when the Maori-Polynesians began their voyage into the East Pacific, then we need not worry about *hypothetical ancestral forms* of these culture elements in any other countries; for the now known geographical distribution—Northwest America and Polynesia—suffices to explain the common use of the same elbow adze, the same *patu* type of club, and the same form of composite fish-hook in these two areas.

Thus, whether the elbow adze in its final shape, as it appears among Northwest Indians and Polynesians, are locally developed inside the nuclear area of Northwest America, or whether it appears there only as as urviving form of a now lost tool once existing in neolithic Asia, has in itself no bearing on a Northwest American diffusion to Polynesia.

The improbability of direct eastward diffusion of stone blade forms from Asia to Polynesia

A comparison with stone blades found by archaeologists in continental Asia and Indonesia has shown that approximations to some of the various Polynesian blade types may be seen along the coast of south China and in the Northern Philippines rather than on the Malay Peninsula, Sumatra, Java and the other Sunda Islands. Thus Beyer (1948, p. 36) in his interesting attempt to settle the disputed question of Polynesian origins by a comparative study of excavated blade forms, came to the conclusion that: "The total absence in Polynesia of the 'beaked' adze, so characteristic of Java and the Malay Peninsula, seems to favor the northern route and to eliminate the Sunda Islands from the line of Polynesian migration."

This is again remarkable, since it leaves out of consideration that principal section of Malaysia which most theories have regarded either as the Polynesian Fatherland or at least as the intermediate road between continental Asia and the eastern ocean. Beyer's analysis considered alone would unquestionably give preference to a Northern Philippine origin of the Polynesian culture, or to the Northern Philippines as stepping-stones from China to the Polynesian islands.

Turning now to the northern Philippine corner of Malaysia to test further whether the stone adze could have spread from there to Polynesia, we must first consider chronology. Beyer found the tanged Hawaiian and East Polynesian adze blade to resemble sufficiently a form from the Middle Neolithic period in Luzon, in the North Philippines, to suspect that the Luzon form was the parent from which the Polynesian type had developed. Yet he found it necessary to stress that if the tanged Luzon form actually had spread into the

Eastern Pacific, then this must have happened "before true rectangular-adze culture reached Luzon." (*Ibid.*, p. 81). Now we learn (*Ibid.*, p. 82) that true rectangular-adze culture reached Luzon between 1750 and 1250 B. C. We should, therefore, be compelled to deduce that one of the Polynesian stone blade forms spread east to Polynesia roughly two thousand years before the earliest known Polynesian era.

Again, if we are to assume that the rectangular blade shape, so widespread in Polynesia, had also spread east from the Philippines, then this must have happened, as Beyer (*Ibid.*) shows, in a subsequent and separate migration that carried this specific form east during the Late Neolithic period of the Philippines, or between 1750 and 200 B. C. In the second century B. C. the true iron culture had reached the Philippines from South India by way of the Malay Peninsula and Borneo. (*Ibid.*, p. 65.)

Finally, if we are also to assume that the lenticular blade form occasionally met with in New Zealand had spread with migrants directly from the Philippines, then this would represent a third separate wave east, since Beyer (*Ibid.*, p. 81) shows that this form antedates even the Middle Neolithic stratum in the Philippines, and belongs to the period about 4000—2250 B.C. Yet, as far as the chronology is concerned, this particular form, as opposed to the others, *could* have been relayed by *Melanesians* and thus reached Polynesia in a feasible Polynesian period, viz. 500—1300 A.D. Its importance in Polynesia is, however, exceedingly limited, and if relayed by Melanesians it has in no case any bearing on Polynesian origins.

Beyer's important and interesting comparative study of archaeologically found blade forms in the Pacific basin will undoubtedly increase in significance when at a future date American blade forms also are included in the general Pacific survey. The great variety of adze blade forms found by archaeologists in the Northwest Coast territory include rectangular as well as tanged forms, but to the knowledge of the present author no specific survey of comparative typology and stratification has been attempted locally.

Some Northwest Coast blade forms commonly seen are reproduced in Plates X and XI. Grooved adze heads related to the form shown in Plate X 5 are found on both sides of the Pacific, and may indeed have reached America with one of its immigrant Asiatic stocks—before the Old World abandoned such stone tools—since some related specimens have also been discovered on the Aleutian islands, in Korea, and in Japan. (Leroi-Gourhan 1946, pp. 45, 213—218.)[1]

Beyer (*Ibid.*, p. 36) is himself the first to emphasize that more complete archaeological evidence is necessary before it is safe, on the basis of Philippine blade forms, totrace the "complicated pathways of the Stone Age cultures over the wide gaps and great distances that separate the inhabited regions of the Pacific". Indeed, the neolithic elbow adze of historic Polynesia must be handled deftly in an attempt to compare its blade form with collected archaeological specimens in any area, if we are not to err completely with regard to possible chronology, and to other cultural considerations.

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[1] Drucker (1943, p. 44) wrote upon his archaeological survey on the Northwest Coast: "The splitting adzes are rather difficult to classify, for they present considerable variation in form, and the several traits which might have had typologic value—type of poll, type of cross section, number of grooves, fluting, etc.—seem to occur in all possible combinations with little tendency to cluster." A classification of six or seven extreme types is presented, in addition to a variety of celt types.

There are further important facts that argue against an eastward spread of the Chinese or Philippine stone blades into Polynesia.

Heine-Geldern (1932, p. 584) shows that the main forms of stone blades used in Polynesia cannot very well have entered the East Pacific by way of Melanesia because of "the radical difference of Polynesian and Melanesian blade forms." Turning next to Micronesia in search of a passage east, the same writer shows that prehistoric finds are rare and there are almost no stone specimens. The very few stone blades found are limited to the rare volcanic islands and there show no dependable homogeneity in forms. He says: "... in general the stone blade had in Micronesia been almost completely replaced by the shell blade which, as long as its forms and dependency of material are not systematically examined, can hardly be compared with the prehistoric stone-blades of Indonesia."

Weckler (1943, p. 20), in examining the theory of a Polynesian route through Micronesia, has this to say about the passage through that vast belt of coral islands: "Since there was no stone suitable for the making of tools, they resorted to implements ground from the shell of a giant shell-fish, the tridacna." Thus, upon arrival in Polynesia, a new culture had to be developed: "For, according to this theory, they had at this time only the coconut and a coarse variety of taro, no domestic animals, no bark cloth, no breadfruit, bananas, or fine varieties of taro, no yams, no sweet potatoes. Presumably they also had to relearn the making of stone tools since they had been using the more easily worked but less durable tridacna shell in Micronesia."

The same logical point has been seen and commented upon by several observers. Even Buck (1949, p. 181), who realized the impossibility of a Polynesian passage through Melanesia, and regarded Micronesia as the only possible opening left, said with regards to this oceanic territory: "It may be assumed that the Polynesian ancestors spent some time in the eastern atolls before they moved further east. The stone adzes they carried with them from the last volcanic island must have worn out, thus forcing them to make adzes of shell. The shell material made it difficult, if not impossible, to reproduce the various forms of the basaltic adzes which they had previously made. Thus the lack of raw material created a gap in the direct transmission of ancestral forms of balsaltic adzes from Indonesia. When the Polynesian ancestors reached Samoa and the Society Islands, the abundant supply of basalt enabled them to discard shell in the manufacture of adzes. The abundance of suitable material, however, could not revive the memory of forms they had never seen, let alone made. It would seem that they had to start all over again with the making of basalt adzes after they reached Polynesia."

We are therefore compelled to draw the following conclusion: Had the Maori-Polynesians stayed long in Micronesia the former stone blade form would have been lost, whereas a quick passage would have implied a direct arrival from Eastern Asia in a period when stone blades where obsolete among the coastal civilizations of the Old World.

Captain Cook is not, indeed, responsible for the analogies between certain Northwest American and Polynesian stone-adze forms. He wrote upon his own arrival among the Northwest Coast tribes at Prince William's Sound (1784, Vol. II, p. 373): "With what tools they make their wooden utensils, frames of boats, and other things, is uncertain; as the only one seen amongst them was a kind of strong adze, made almost after the manner of those of Otaheite [Tahiti] and other islands of the South Sea."

In the wake of Captain Cook came the navigator Dixon (1789, p. 244) who similarly observed that, apart from some modern iron tools left by Russian fur traders, the only cutting implement to be seen "was a toe made of *jasper*, the same as those used by the New Zealanders".

From these early days of discovery, the common form of this principal tool in Northwest America and Polynesia has been generally realized. Long before Olson in his special inquiry had called attention to the fact that the nuclear Northwest Indian adze occurred in Polynesia in an almost identical form, Jacobsen (1891, p. 162), in his paper on Northwest Indian-Polynesian analogies, had written: "Also the adze-handle and the method of securing the blade to the wooden handle are exactly the same among the Polynesian people as among the Northwest Americans."

And Holmes (1919, p. 29) had stressed:

"The stone adzes and pestles of the Northwest Coast resemble the adzes and pestles of the Pacific islands more closely than they do the corresponding tools of the eastern shores of America..."

At regular intervals attempts have been made by ethnologists to demonstrate this apparent and yet never explained fact. The last serious effort was represented by the Ekholm exhibit for the International Congress of Americanists at the American Museum of Natural History in 1949. The question of relationship was properly raised, but in view of the current doctrine on Polynesian migrations direct from Asia, no attempt was made to answer it.

The rectangular plank-house

Following Olson also in his choice of the third characteristic culture trait of the occupants of the Northwest Coast territory, we shall now consider the unusual form of the local native dwelling.

Olson goes on to show that in the same nuclear area where had been achieved the highest development of sea-going craft and the final form of the elbow adze, the aborigines had developed also the most advanced house form. Ready access to easily split timber and local perfection in the dubbing of planks had encouraged a house form well known to our race but most exceptional among aboriginal races, namely the rectangular plank-house with sloping roof. Among the Haida, Kwakiutl, Tsimsyan, and Tlingit, the evolution hade gone still further by the invention of the gabled roof.

These houses, with their decorated fronts have, ever since the Europeans arrived, surprised observers through their similarity to Maori dwellings. Rectangular and gabled house forms are found on many of the islands of tropical Polynesia, but the walls are naturally made of light bamboo, spaced sticks, or plaited mats, to suit the tropical climate on these islands. Therefore, excluding for the moment the more airy dwellings of Polynesia proper, all of which fall between the limits of the two tropics, the following description refers to house forms in the cooler climates of the Northwest Coast and in New Zealand. In both these extremities of the Polynesian ocean were found houses solidly built, with broad, hand-split boards covering the walls as well as the roof. The ground plan was rectangular, with long and usually very low side walls, and a gabled (but never steep) roof rested on strong corner-posts while sloping towards the long side walls. On the Northwest

Coast these plank-houses were occasionally up to 70 feet long (Dreyer 1898, p. 131) and, according to Bachmann (1931), a certain Maori plank-house was found to be 85 feet long, 30 feet broad, and 20 feet high under the gable.

In both areas even the largest house always consisted of one single room, although the roof in such larger buildings was supported by interior house-posts in the four corners and sometimes even in the centre. The floor was generally excavated and left uncovered, apart from plaited bast mats which took the place of beds. There were neither beds, chairs, benches nor any other form of furniture inside these houses. The Northwest Indian and Maori, like other Polynesians, slept on these bast mats, and when they ate, assembled at meetings, or otherwise were seated, they always squatted, like so many other primitive peoples, touching the ground only with the flat soles of their bare feet. There was no window opening to let the light in, and the door, which was low and narrow, was always placed in one of the end walls which represented the facade.

The facade

A remarkable concurrence was the practice common to Northwest America and New Zealand of occasionally carving the doorway of the house in the shape of a large ancestral figure, and in such a manner that the opening of the door was straddled by the legs of the figure or else coincided with the womb. My attention was called to this remarkable parallel by Dr. Carl Schuster, whose research in comparative designs among the peoples living round the Pacific had convinced him of some direct prehistoric contact between the Maori and the Indians of Northwest America. (See also Plate XIII.)

The house-fronts are often ornamented all over with conventional patterns and ancestral figures, partly carved, but on the Northwest Coast more often painted. Old illustrations of Kwakiutl houses show a little human figure carved in wood and placed on the gable above the door, precisely as the Maori placed their gable images in New Zealand.

The house-posts

The wooden house-posts were often carved in the round to represent ancestral figures. Among the carved wooden columns from these peoples exhibited at the Brooklyn Museum of Art are two well executed specimens, both of which represent a main figure carved with large head and stunted legs and with the arms bent at a right angle, the hands placed below the chest. Both carry in front of them a much smaller figure, with its back against the bearer and arms bent with the hands conventionally placed in front of the body. The resemblance between these two native wood-carvings is sufficiently apparent. One is labelled "Wooden House Post, from Kwakiutl Indians", and the other "Wooden House Post, Maoris, New Zealand". (Plate XIV.)

Schurtz (1895, p. 66) points to the strong resemblance, in idea as well as in form, between the carved centre-posts in the Maori and Northwest Indian plank-houses.

Such striking cultural parallels must be due either to independent evolution among *related* minds, or else to cultural diffusion. Both the defenders and the opponents of any proposed diffusion in the Pacific occasionally seem to consider movement on this ocean restricted to a one-way traffic up against the wind. Thus Jenness (1932), opposing any local diffusion, restricted himself to a series of very good arguments against Polynesian migrations into Northwest America, but overlooked the reverse possibility, for he passed over the similarity of the Maori house-posts to those of the distant Northwest Coast with the remark: "... if the house-posts in the latter region [N. W. Coast] were inspired from abroad, why do they not appear farther south along the coast of N. America?"

Carved house-posts are not found farther south along the North American coast because that is not where they were developed, but they occur sporadically in an almost continuous belt from north to south across the Northwest Indian and Polynesian islands, even though the warm plank-covered walls had been abandoned except in the two cooler extremities. Burrows (1938, p. 43) states: "House posts were carved with human figures in Rarotonga." Linton (1923, p. 285) mentions the wooden house posts in the Marquesas, which were either ornamented with non-naturalistic designs, or carved in the round as human figures. And farther north, in Hawaii, they are referred to in a Report of the Hawaiian Historical Society (1920) in a comparison of the more elaborate house-posts of the Northwest Indians and the Maori.

Jacobsen (1891, p. 161) wrote: "As is well known, the early Maori of New Zealand ornamented the entrances to their houses with most artistically carved posts, which have a certain relationship to the totem-poles of the natives of Northwest America. ... Before the Indians became acquainted with European paint, the colours of their totem-poles were almost like those of the South Sea islands."

Mortuary and ancestral poles

Related to the idea of carving elaborate house-posts, is the well-known practice among the Northwest American Indians of carving great wooden columns and erecting them in the open near their plank-houses, or on the burial grounds. Popularly referred to as 'totem-poles', these carved posts represent a peculiar custom that has become a marked culture trait characteristic of the Northwest Coast people.

It is generally accepted that the average totem-pole as we know it from museum specimens and Northwest Indian villages today, with a multitude of complex figures running up a very lofty column, differs considerably from the simpler carved wooden posts raised by these Indians in prehistoric times. (Barbeau 1928.) Of course, the idea was not brought by the Europeans, who had Christianity and their own modern civilization to spread; but the size of the carved pole increased rapidly with the European introduction of iron tools. Whereas the great war- and travel-canoe gradually disappeared as it was replaced by European vessels, the carved wooden column became a boastful symbol of the owner's prosperity and tribal importance. The original carved columns among these Indians were great wooden images and carved posts, which only rarely seem to have consisted of more than two superimposed human figures.

This necessary reduction of the size and splendour of the Northwest Indian totem-poles brings them down to the general level of the carved wooden columns correspondingly erected by the Maori, which are typical also of their early settlements. These carved Maori posts were at the arrival of the Europeans used either as door-posts or as mortuary columns, precisely as was the custom among the Northwest Indians. (Newcombe 1907, p. 138.) As among the American creators of this peculiar art, so also in New Zealand, the carved column was occasionally a tall post with a figure at the top, or else one or two superimposed ancestral figures. A rough sketch made by Polack (1838, Vol. I, pp. 137, 138) of contemporary Maori cemeteries with their variety of posts and carved woodwork will seem strikingly familiar to anyone who has visited some of the abandoned 19th century Kwakiutl cemeteries on Vancouver Island or those still to be seen in other areas of the adjoining coast.

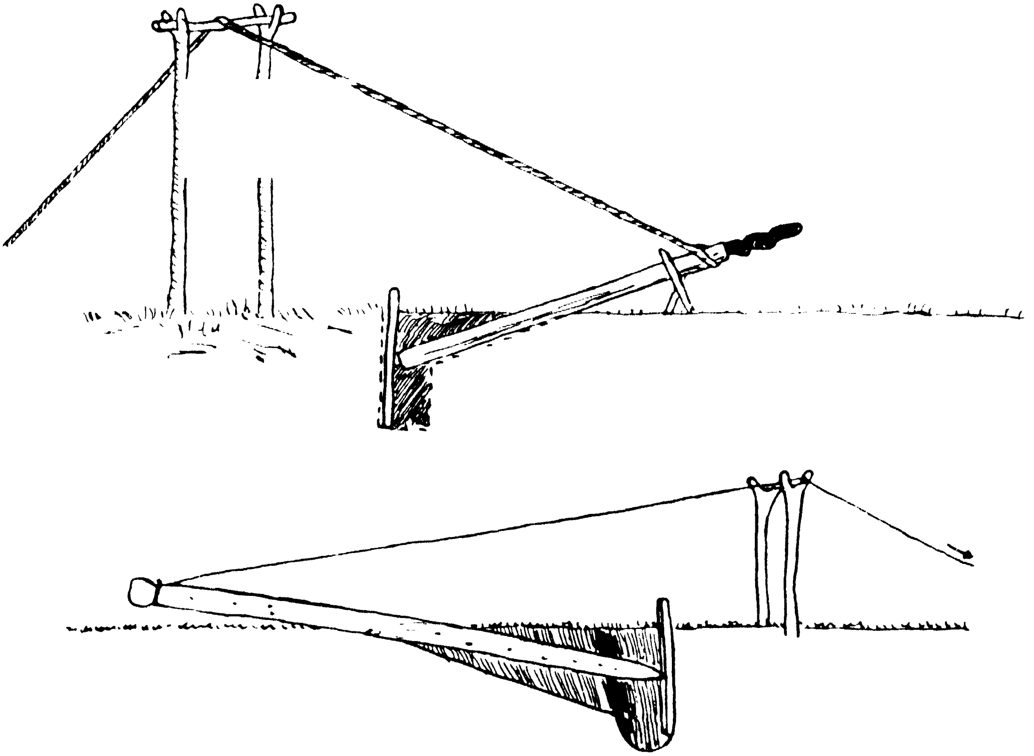
Even Maori specimens could at times reach impressive dimensions. Polack (*Ibid.*, p. 92), writing from New Zealand, speaks of "carved monuments, painted red, that told the tale of those departed. One of these sepulchral posts was nearly thirty feet high; the upper part carved out into the resemblance of a man, with the ancient Egyptian sameness of expression standing on the head of a figure below with a grotesque face; the tongue, as is usual in the gravings of the native artists, was stretched as far as the material would allow the member to be extended; the eyes were formed of pieces of the pearl, paua, or mutton fish-shell..."

Carved ancestral posts, on which one of the two superimposed figures thrusts out its tongue, as described by Polack, are well known among the Maori, and are a direct repetition of an old custom very common among the post-carvers of the Northwest American coast. Such examples were still to be seen in the Cowichan district of Vancouver Island in *1939, and* Barbeau *(1929), in a monograph* on Northwest Indian totem-poles, reproduces similar specimens from the Skeena River tribes on the mainland much further north. In his series of illustrations of local Northwest Coast posts, Barbeau also spontaneously introduces a large Maori specimen, stating: "The totem poles, as fairly recently carved and erected on both sides of the Pacific, offer the same compelling resemblance. The technique for their erection was also identical." (See Plates XV, XVI.)

In early Tahiti such posts seem to have developed to a great size, almost equelling the historic posts of Northwest America. When Wallis discovered Tahiti in 1767, Robertson (1766—68, p. 191) went ashore and made the following record of the local 'totem-poles': "Here I saw several Images of Men and Women set up close by their Houses, rudely carved out of a large tree, on one of those trees their was five human figurs cut out, and all standing the one on the top of the oythers head, the lowermost was a man on the top of his head their stood a Woman fully as large as the man, on the tope of her head their stood another man but mutch smaller nor the man below, on his head their stood another Woman about his own size and on the tope of all their was a great stout fellow with all his parts proportionable, the oythers had some two, oythers three and some four Images cut out, but the upermost was always the largest and a man, they are non of the finest carvers but they take care to imetat nature so Exact, that no man can mistake the sex which they mean to represent..."

Forster (1778, p. 554) wrote from the same island a few years later: "Lastly, near the marais are twenty or thirty single pieces of wood fixed in the ground, carved all over on one side with figures about eighteen inches long, rudely representing a man and a woman alternately, so that often more than fifteen or twenty figures may be counted on one piece of wood, called by them Teehee [Ti'i]."

Thirty foot specimens like those seen in Tahiti and New Zealand have not been recorded



Method for erecting 'totem-poles' among New Zealand Maoris (above) and Northwest American Indians (below). After Barbeau 1929.

from other Polynesian islands, although smaller wooden posts, carved as ancestral figures, are known both from the Marquesas[1] and Hawaii. Bryan (1938, p. 59) reproduces some sketches of carved wooden posts of large size and in human form, drawn by Arago (1819) and Ellis (1823) in early Hawaii. Ellis (1829, Vol. IV, p. 165), who saw many of the original posts before their destruction by the missionaries, left us with the following description of the burial place of a group of pre-European kings in Hawaii: "Several rudely carved male and female images of wood were placed on the outside of the enclosure; some on low pedestals, under the shade of an adjacent tree; others on high posts, on the jutting rocks that hung over the edge of the water. A number stood on the fence, at unequal distances all around; but the principal assemblage of these frightful representatives of their former deities, was at the south-east end of the enclosed space, where, forming a semi-circle, twelve of them stood in grim array,... They stood on small pedestals, three or four feet high, though some were placed on pillars, eight or ten feet in height, and curiously carved." In another place Ellis (*Ibid.*, p. 428) speaks of the destruction of all but three carved wooden posts. One of the remainders "stood sixteen feet above the wall, was upwards of three feet in breadth, and had been carved out of a single tree."

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[1] The remains of a small five foot carved wooden figure on a pedestal was seen by the author in Ouia, Fatuhiva as late as 1937.

Byron (1826, p. 199) also has a sketch of the remains of the prehistoric Hawaiian burial place or "Morai near Karakakooa", showing more than twenty mortuary posts in grotesque human shape, besides a number of "poles with carved heads" and a columnar image carved with "a child in its arms". (*Ibid.*, p. 200.) They were erected inside a wooden palisade marking the pre-European sanctuary, precisely in the same customary manner of some of the aboriginal burial grounds on the Northwest Coast. Early voyagers who had first seen these peculiar East Pacific mausolea, and subsequently visited those erected by the neighbouring islanders of the Northwest Coast Archipelago, were much struck by the resemblance. (E.g. Marchand 1801.)[1]

The present dominance of the Maori spiral

Returning to the carved ancestral posts of New Zealand, we find that there is only one distinction of consequence between the Maori and the Northwest American specimens, which will strike the observer at the first glance. The surface of the Maori post, like that of any other Maori wood-carving, is commonly covered by a shallow and conventionalized spiral motive. But the spiral is absent from Northwest Coast carvings, except in the stylized reproduction of the nostril of beaver, bear, and dragonfly. (Boas 1927.) This literally superficial distinction has been a favourite argument against there being any connection between the respective ancestral forms. Yet, the most this everpresent Maori spiral motive can tell us is that there is no Maori influence on Northwest Indian art. As an argument in the opposite direction the Maori spiral is without value. It is clearly possible that the Maori may originally have reached New Zealand with a very limited and casual use of the spiral; indeed, we have strong evidence of this in its absence from the art of all the other Polynesian tribes, whose ancestors, until the beginning of the present millenium, were shared with those who pushed south to colonise New Zealand. Irrespective of how and when the Maori began to cover their carvings with spirals, the habit is absent in their Polynesian homeland and may therefore very well be so also in their still earlier fatherland further away. There is, indeed, no such curvilinear surface design on the wood-carvings of the Society Islands, and these include the very tall ancestral posts which were erected in ancient Tahiti.

The eye-ornament

There is, however, one other detail in the ornamental design which has a less local character in Polynesia than the spiral. That is the eye-motive as a separately developed ornament. Schurtz (1895), in his treatise of the eye-ornament and related problems, demonstrated how this art motive was limited to the American side of the circum-Pacific area. This typically New World development had reached its greatest importance among some of the American high-cultures and among the Indians of the Northwest Coast. Against the background of this markedly New World distribution, the author goes on to show how the same motive reappears on the islands in the adjoining half of the Pacific Ocean, and is even repeated there in a form which he says "completely corresponds to what we observed in Northwest American art."

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[1] A few writers, like Schurtz (1895, p. 64) and Friederici (1929, p. 467) have noted that the practice common to the Northwest Indians and Maori of erecting carved ancestral posts is shared also by the intermediate tribes in tropical and subtropical Polynesia. But most Northwest Coast observers seem to have overlooked this point. Niblack (1888), seeing only the great distance between the Maori and the Northwest Coast tribes, wrote: "Many resemblances of the Haida to widely remote stocks have been pointed out by writers, but to illustrate how futile such clues are in tracing the origin and relationship of the tribes of the world, a parallel is here briefly drawn between the Maori of New Zealand and the Haida. . . .In Plate LV, Fig. 295, a Maori tiki is illustrated along with several Haida carved wooden columns. The carved wooden mortuary columns erected in front of the Maori houses are also suggestive, but it is safe to say that while all this is not in one sense accidental, yet the resemblances and similarities are as likely to have arisen from the like tendencies of the human mind under the same external conditions or environment to develop along parallel lines as through contact of these tribes or through a common origin."

Suspecting the possibility of Polynesian migrations *from* Indonesia and *to* Northwest America, Schurtz looks for the *source* of the same motive *westwards* in the Pacific, but concludes: "The occurrence of the eye-ornament is here strikingly insignificant, and becomes the more unimportant the further we proceed to the west, so that from the Melanesian to the Malaysian stylistic areas distinct transition may be noted."

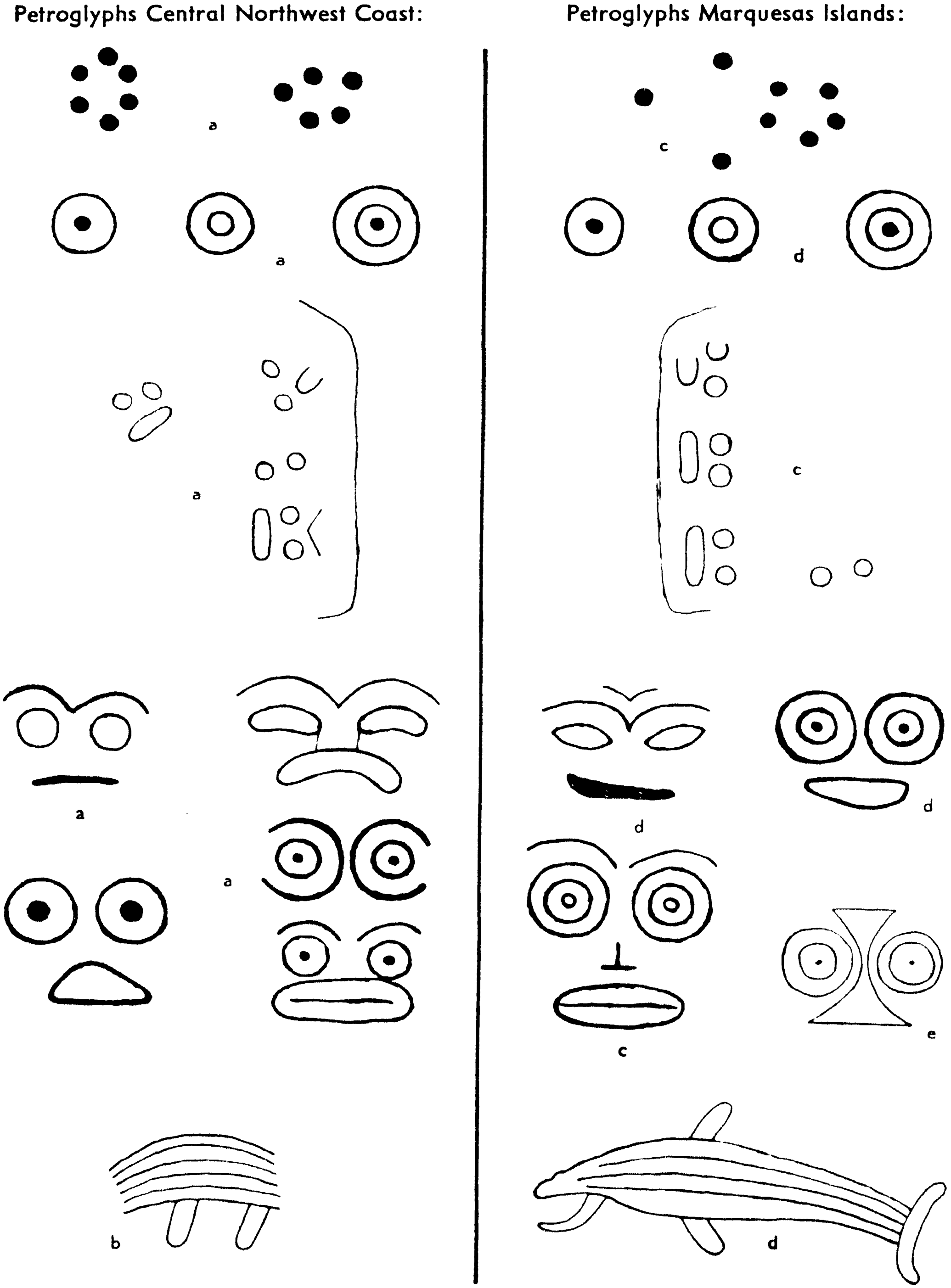
He also admits that the absence of the outrigger in Northwest America is a serious obstacle to his own theory, but in spite of these apparent difficulties he maintains: "The similarity in ornamental art of such distinct localities cannot but demand attentive consideration..."

Petroglyphic designs

The eye-motive is not restricted to the wood-work of these two people, but is occasionally transferred to conventionalized markings upon cliffs and rocks. After discovering in 1937 a series of Polynesian petroglyphs on Fatuhiva Island in the Marquesas Group (Omoa and Hanavave valleys; Heyerdahl 1938; 1941 a), I was by chance confronted with a photographic collection of Bella Coola Indian petroglyphs from the Northwest Coast, brought together by the former local Indian agent Mr. Fougner. The similarity between these, the Fatuhiva specimens, and other known petroglyphs from Polynesian tribes, was in my opinion too unusual to be a coincidence. When later I visited the Bella Coola valley for a further inquiry, the help of local Indians made it possible to uncover additional groups of petroglyphs. The antiquity of these was apparent from the age of the vegetation that had overgrown them, and in one case by the fact that ancient steps had been carved leading to the site in the cliff of a river bank, revealing that the level of the watercourse had been quite different when the incisions had been made.

The most important element common to the petroglyphs of these two distinct East Pacific areas—Polynesia and the Northwest Coast—was probably a highly stylized face, consisting usually of nothing but eyes and mouth. The eyes were generally reproduced as concentric circles, or as a dot and one or more concentric circles; the mouth usually outlined as an oval, occasionally divided by a straight line. Nose and ears were generally omitted, likewise the outline of the head itself, with the hair and the neck. Instead of these more conspicuous, and to our mind more important details, the creatos of these petroglyphs, in both areas, frequently added a pair of curved and adjoining eyebrows. The concurrence of these highly conventionalized petroglyphic faces was marked and suggestive.

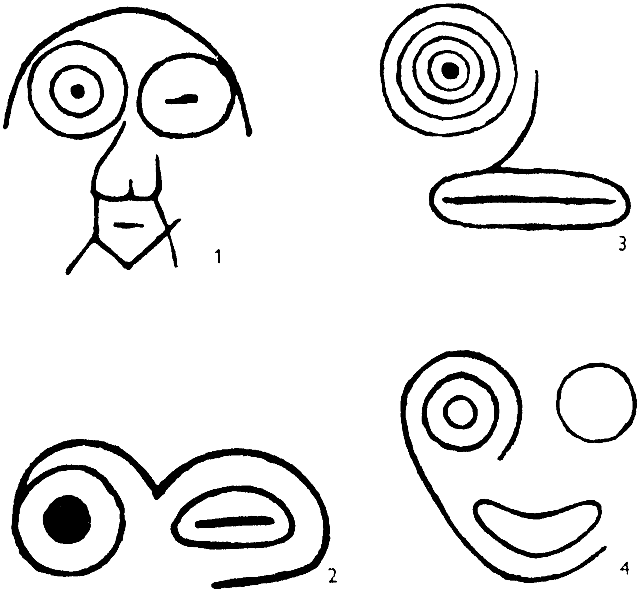
A further parallel between these rock-carvings was found in an apparent common tendency of evolution from a simple incision on the surface of a smooth rock to a point where they actually approached a three-dimensional carving. The projecting corner of a



Petroglyphs Central Northwest Coast:

Petroglyphs Marquesas Islands:

a from Bella Coola Valley. **b** from Sproat Lake, Vancouver Island. **c** from Puamau Valley, Hivaoa. **d** Omoa Valley, Fatuhiva. **e** Tahiti. (**e** after Emory 1933.)



1 and **2** from Bella Coola Valley, Central Northwest Coast. **3** from Omoa Valley, Fatuhiva, and **4** from Puamau Valley, Hivaoa.

rock would be used to give some sort of a profile in addition to the usual front view, the large eyes being carved on either side, and the mouth being cut in an angle round the edge. In one case at Fatuhiva, the projecting section of a larger rock was even artificially rounded into the rough shape of a head, on which only eyes, mouth, and a double pair of eyebrows were incised.

Another large stone in the Marquesas Islands (Puamau Valley, Hivaoa), probably an altar-stone, had a moon-shaped mouth across the edge of a projecting corner, and the eyes placed one on either side, but in this case the right eye was formed as three concentric circles, whereas the left eye simply consisted of one single ring. In other incisions in the same group the right eye might be elaborated—up to a dot and four surrounding circles—whereas the left eye was simply omitted. In complete analogy, even in this detail, the Bella Coola specimens on the Northwest Coast included big-eyed faces, and some with the right eye reproduced as a dot surrounded by one or two circles, whereas the left eye was carved as a single circle enclosing a horizontal line, or simply squeezed together as an oval enclosing a horizontal line. The apparent aim of the artist was to depict the face of some one-eyed deity or culture hero, who was blind in the left eye.

Pounders and pestles

The carving of this one-eyed face, incised in the same style and manner as the petroglyphs left on rocks in the open, was in the Marquesas Islands in some cases transferred to the beautifully polished surface of some of the ancient local stone pounders.[1] These Marquesan stone pounders, like related forms on the other Polynesian islands, represent in lines and workmanship some of the outstanding achievements of practical art in Polynesia. The forming of these often exceedingly hard and compact stone utensils into their slim and elegantly curved shape and polished beauty is an intricate process which cannot even be repeated to its full extent by the twentieth century islanders with iron tools. Even to-day old inherited stone pounders are in current use on many Polynesian islands, and in the early days these conventional artifacts were the regular kitchen equipment of any Polynesian household. Their main application was to mash a heavy paste, the *poi*, made from taro or breadfruit.

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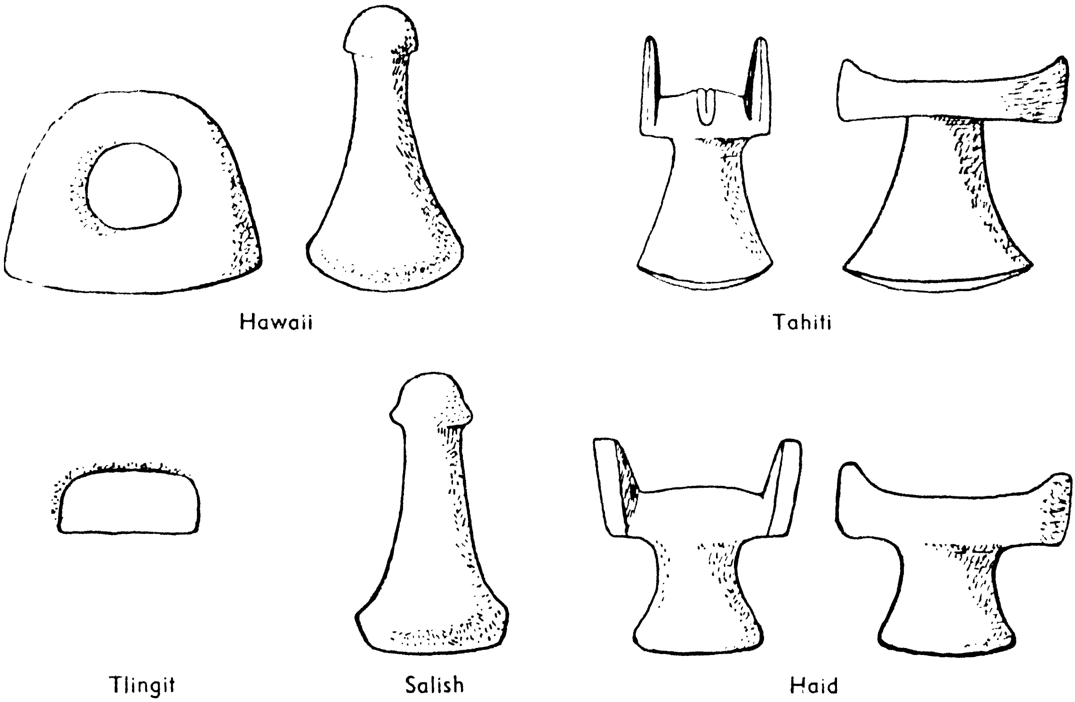
[1] A specimen of this type, acquired by the author on Fatuhiva Island, is at present in the Brooklyn Museum of Art.

The archaeological conformity and wide distribution among the islands of these carved and polished stone pounders is sufficient to show that we must look for an outside origin and diffusion with the ancestral immigrants. We do not find anything corresponding to them in Indonesia or the Old World, not even among archaeological material. But ethnologists have long attempted to explain why beautifully carved and polished stone pestles, almost identical in shape and workmanship with those of Polynesia, reappear in the Northwest American territory. The antiquity of these Northwest Coast specimens is not to be disputed, as various stages of evolution are excavated locally from the ancient shell-mounds and kitchen-middens; and related forms, although less elaborate in the evolution of the grip, are found widely in adjoining Northwest America. The present writer has witnessed the excavation of a nicely developed Salish-like specimen in the Slocan Valley, 250 miles inland.

The remarkable correspondence between these peculiar and characteristic Northwest Indian and Polynesian implements has often been pointed out by writers, and more recently again by the Gordon Ekholm exhibit of the last International Congress of Americanists (1949) at the American Museum of Natural History.

In spite of this compelling resemblance (fig. p. 121), which promptly may give us an answer in our search for the extra-limital prototypes of the Polynesian forms, the attention of the sceptics has only been focused on one distinguishing point: the Northwest Indian specimens had a flattened base and were used as grinders or pestles, whereas the Polynesian specimens had a vaguely convex base and were used as pounders for the soft *poi*. This diverging detail, however, cannot outbalance the apparent fundamental unity in the general design and workmanship of the tool as such, and Stokes' analysis (1932) of early Hawaiian stone pounders seems to eliminate the validity of the argument entirely. Of the pounders in the Hawaiian group, which would form the natural geographical link in a possible connection between Northwest American and Polynesian specimens, Stokes (*Ibid.*, p. 599) wrote:

"In its final stage it was used to mash wet taro into a heavy paste. However the evolutionary examples seemed to record some experimentation in changing a grinder suited only to dry material, such as grain, to one suited to the later known use. This conclusion was reached after close attention to the attrition surfaces and evolution in the grips. These implements were formerly used on flat or slightly concave stones—not the wooden platterns generally used for *poi*. In addition, the implements referred to blended with another and rare form of grinder of a highly developed type, so far without analogy elsewhere as to shape. The latter was denfiitely a grinder, and had never been used for pounding—the standard method of making *poi*."



Polynesian and Northwest Indian stone pounders and pestles.

Since there is direct reason to believe that the Hawaiian stone-pounder *arrived as a grinder*, and later had the attrition surface modified for the purpose of mashing *poi*, we find traces of the slight evolution from the one form to the other just in the group that would provide the stepping-stone from the cooler Northwest Coast into the tropic Polynesian island world where such food as taro and breadfruit would change the staple diet.

There is only one detail to add concerning these kitchen utensils. In the museum collections of Vancouver and Victoria B. C., there are Northwest Coast specimens which have the handle shaped into phallic form, a detail repeated in the Marquesas Islands; and there are other Northwest Coast specimens which have the handle shaped to resemble a long neck with a human head on the extremity, also a feature repeated on the same type of pounder in the Marquesas Group.

Curved ceremonial objects of polished stone

The same degree of skill in stone-shaping is seen in two beautifully formed objects of smoothly polished stone exhibited at the American Museum of Natural History. They are both in the neighbourhood of 15 inches long, very slender, slightly curved lengthwise when seen in profile, pointed, and polished to shine like ebony tusks. The striking similarity between the two pieces was first pointed out to me in 1941 by the curator of prehistoric archaeology, Mr. N. C. Nelson, who felt that these artifacts, respectively from Northwest America and New Zealand, combined with other archaeological analogies in suggesting some sort of direct prehistoric transfer between these two Pacific localities. Recently the same two artifacts were also compared by the Ekholm exhibit. The purpose of these nicely executed pieces is not known. They resemble more than anything the head of a European pick-axe, but the beautiful polished finishing and fragile slenderness suggest nothing other than purely ceremonial use.

One-hand clubs of whale-bone and polished stone

The most outstanding examples of the art of carving polished stone in Northwest America may be seen in the conventionally executed neolithic war-clubs. These polished and well formed stone clubs are so typical and yet unusual in idea, form, and achievement, that their recurrence among the Maori of New Zealand has aroused more discussion than, probably, any other culture element common to these two areas. Although designed for utility, these clubs are unique products of neolithic art, on account of their elegant form, their perfect balance, the smoothly polished surface, and the skilful working of the butt grove and thong hole, all of which characterize the finer specimens of this weapon within both areas.

Parallel with the distribution of this polished stone club goes the conventionally shaped physeter- or whale-bone club, common also to these two particular groups of people.

Even Cook, when first confronted with the Northwest Indians of Vancouver Island in 1778, noticed the peculiar absence of arrows, spears, and other projectile weapon among these coast Indians, and wrote (1784, Vol. II, p. 324): "From the number of stone weapons, and others, we might almost conclude, that it is their custom to engage in close fight." Himself the discoverer of the local Nootka people, he informs us quite spontaneously that the unusual bone club seen among the population was "somewhat like the *patoo patoo* of New Zealand."

Captain Cook had no preconceived opinion as to any extra-American relationship of the Northwest Indians, and his constant return to comparisons with the Maori is thus of additional value. He was so struck by the esteem of the Maori and Northwest Indians for this same unusual form of weapon, that upon his return to England, he had some brass models cast of a beautiful Maori *patu*, and these metal clubs he later brought for barter with native Northwest Indian traders, writing: "Beads and such other toys were in little estimation. Nothing would go down with our visitors but metal; and brass had by this time supplanted iron."

A century later Jacobsen (1891, p. 162) detected the same conformity, and wrote: "We find among Maori weapons a war club which was formerly in common use. It was generally fashioned from whale-bone, or from nephrite and other stones. Exactly the same weapons were used by the inhabitants of the Vancouver and Queen Charlotte Islands. The resemblance in form and size is so remarkable that even the great discoverer Captain Cook was struck with it, when he first saw the weapons among the Maori and then in America."

The antiquity of these conventional polished stone and whale-bone clubs over a wide area of the Northwest American coast is apparent from their former use among distantly related local tribes, and from their existence in very early pre-metal, and hence pre-European, layers of the local kitchen-middens.

We may read on the labels of Northwest Indian clubs of Maori form in the Provincial Museum in Victoria, B. C. (Italics by T. H.):

"War-club. Of polished stone, with handle perforated for a lanyard. *From a shell mound.*" And: "War Club. Of whalebone, with perforated handle representing an eagle's head. Of ancient type. *From a shell mound.*"

The perforation of a thong hole in these clubs is in itself worthy of attention. This hole was drilled in the same place on the same type of one-hand polished stone clubs from Northwest America to Hawaii (Brigham 1902, Plate XL) and New Zealand. I am certain that the reader, with full access to iron tools, will fall short in an attempt to copy this conventional club form from a rough block of nephrite or other hard polishable stone. The Northwest Indians and their Polynesian neighbours did it before working tools of metal were known to any of them. The great difficulty of making such a peculiar weapon is a strong argument against the probability of independent evolution.

Perceiving the practical difficulty involved in the carving and polishing of the Northwest-Indian-Maori *patu onewa* type of stone club, and the improbability of a double evolution, Imbelloni (1930, p. 336) says: "... and in order to judge whether this is easily done, let us remember only the way the Maori managed to drill the hole of the handle; a performance which is a miracle of ingenuity and constancy."

It can hardly be a coincidence, the same author points out, that Northwest Indian and Maori warriors followed each others in carving the same genetic forms of club from the same respective materials, namely the *patu onewa* from stone and the *patu paraoa* from physeter bone. He also calls attention to the fact that the physeter bone clubs of the Maori and the Northwest Indians often followed each other in such a detail as having a stylized bird's head carved on the butt-end; and furthermore that these remarkable ethnological conformities in club forms "were already recorded by some classical founders of the ethnology. Ratzel says in various places that 'the Northwest American Indians have in use bone clubs identic with those of the Polynesians'." (1928 b, p. 327.)

Imbelloni (1930, p. 336), in his repeated efforts to call attention to these specific club conformities, insisted: "... we find in North America not only the New Zealand *patu onewa*, but also the *patu paraoa* and the *miti*, and all the different degrees of variation and accumulation of essential and decorative elements whose dissociation and aggregation, from the simplest specimens to the most complex, constitute the organic law of the family of the spatular weapons gathered around the *mere*."

About the time when Imbelloni first presented his comparisons of club forms, MacLeod (1929, p. 425) followed up the same subject, and found it practicable in the same way to apply Maori genetic names to the archaeological specimens of Northwest America. He stated:

"About Puget Sound the *mere* type known as the *mere onewa* is abundant; and another form, usually animal headed which is perhaps related to this type of *mere*. ... About Puget Sound is also found, in a restricted area, a middle-ribbed *mere* type which is apparently related to the middle-ribbed *mere* of Polynesia; and a modified *mere pounamu* type appears which, however, is also found down in northern California. The west coast of Vancouver Island offers cases of a curved *mere onewa*. Among the Tlingit to the far north we find club forms which are very plainly related to this cruder Nootka form."

Origin and spread of the patu clubs

There can be no question that, had similar clubs been discovered in any part of Indonesia or Eastern Asia, they would have been received, without much controversy, as a genuine guide to the source of Maori-Polynesian migrations. Neither Cook nor the many earlier Spaniards who crossed from Polynesia into Malaysia would probably have been suggested as hypothetical spreaders of local culture elements between these regions. However, when the highly conventional fighting weapons of the Maori allow a direct genetic comparison with corresponding culture elements in America, as here shown by Imbelloni, then even otherwise unbiassed observers find the correspondence between these two particular regions to be so unique and unexpected, that their main reaction is to ponder some hypothetical excuse for the phenomenon.

Imbelloni (1930, p. 336), when engaged in the first systematic comparison of Northwest American and Maori club forms, became sufficiently familiar also with available Northwest Coast material to realize the absurdity of crediting Cook with the introduction of the bone and stone club into this area. He says: "I will not enlarge upon this; it will be enough to remember the adzes, pestles, fish-hooks, etc., of Polynesia and the northwestern coast of America in order to prove a transplantation of an integral patrimony."

Imbelloni based his view on the chronology of this proposed relationship partly on a previous contribution by Skinner. The latter, a recognized Maori expert, presented in 1916 a special paper in which he advanced the view that the whole local *patu* group of spatulate clubs had been evolved by the Maori himself *inside* New Zealand. On this premise Imbelloni (1930) judged the suspected cultural diffusion to have carried the *patu* group *from* New Zealand up to Northwest America. However, no sooner had Imbelloni launched his view than Skinner (1931) opposed him by presenting a new paper in which he abandoned his own previous claim that these clubs had been evolved locally in New Zealand, with the following logical justification:

"A consideration of data not available when the paper of 1916 was written has led to a revision of the views expressed in it."

He says further (p. 194): "...we have as yet no statigraphic evidence as to the evolution of the *patu* in New Zealand. ... Teviotdale's excavations at the Shag River show that the technique of stone work was as accomplished in moa-hunter times as at any subsequent period. For the present we have no stratigraphic evidence, and can judge as to the antiquity of varieties of Maori *patu* only by geographical distribution. Varieties which occur also in the Chathams must be old."

It is very significant, as with the carved ancestral posts, to note that these *patu* clubs are not restricted to the Northwest Indians and the *Maori*, although it was among these tribes that the short clubs were of the greatest importance and were held in the highest esteem. In addition to discovering the Northwest Indian type of *patu* club in Hawaii (Brigham 1902), New Zealand and the Chatham Islands (Haast 1886, p. 24), quite analogous forms were found on Samoa at the western extremity of Polynesia, and Easter Island at its eastern extremity, with vestiges also in Tahiti (Skinner 1931). As Skinner admits in his last treatment of the question, this wide Polynesian distribution of clearly related forms shows that the *patu* is not a Maori invention, but an ancient pan-Polynesian inheritance.

Skinner does not reverse the direction of the transplantation claimed by Imbelloni, but holds (*Ibid.*, p. 195) that the Northwest Indian clubs "are related to the Oceanic *patu*, if at all, only through hypothetical remote ancestral forms from coastal Asia."

If we are to rely on purely hypothetical Asiatic forms where no *patu* is found, we shall soon be leaving the firm ground of practical research. Skinner, attempting to reduce the value of Imbelloni's comparative study, does still, in an unexpected way, provide the best practical demonstration of the striking resemblance between these clubs. Having first shown the doubtful origins of such very few *patu* specimens as have been found at large in North America, Skinner goes on to admit that Imbelloni's pieces from the states of Washington, Oregon and British Columbia "are undoubtedly authentic native pieces" which "do resemble in a remarkable way" the *patu* club of Polynesia. He says further: "A very little research would have enabled Imbelloni to strengthen his series considerably. I do not think, however, that even such a strengthened series would prove trans-Pacific influences. It would seem that this, and numerous other cultural similarities between Oceania and the north-west coast, are due to a common cultural ancestor in coastal Eastern Asia."

This specific similarity, which includes genetic details in conventional club forms, must be rather convincing if we are to resort to hypothetical forms in Eastern Asia—where none has been found—to unite existing forms in two adjoining territories of the East Pacific. But the best criterion of the resemblance in some of the local club forms is seen by the fact that even trained observers may get confused as to their actual identity. A whale-bone club depicted by Imbelloni from Vancouver Island is thought by Skinner possibly to be a Polynesian club brought there by Captain Cook, although it happens to be of a Northwest Coast type well known from prehistoric Nootka kitchen middens, and a representative of the Nootka whale-bone clubs which Cook himself (1784, Vol. II, p. 324) was the first European to see, when he declared them to resemble "the *patoo patoo* of New Zealand".

Cook was the first to draw a comparison between the existing club forms of these two areas. The last time ethnological attention was called to the matter was through the Gordon Ekholm exhibit in 1949.

Bow and arrow unimportant in warfare

With the beautiful one-hand *patu* as their favourite and traditional weapon, the Maori, like the Nootka, Kwakiutl and Haida Indians, preferred to fight their wars hand to hand. As among the Nootka, Kwakiutl and Haida, so also among the Maori-Polynesian tribes, the bow and arrow was known and used for hunting rats and game, but ignored as a fighting weapon among men. Although the bow and arrow is a principal weapon as soon as we enter the Melanesian islands westwards of Polynesia, and thence had spread as a fighting weapon only to neighbouring Tonga, it was not even *known* at the eastern extremity of the ocean. Agüera wrote from Easter Island in 1770 (p. 99): "I made a bow and arrow, duly strung, by way of experiment, and on handing it to one of those with the scars he instantly stuck it on his head as an ornament, and then hung it round his neck with much joy, being totally ignorant of its use and effect."

The tongue as symbol of challenge and destruction

There was in New Zealand another peculiar weapon which was occasionally used in war, although it had principally become a ceremonial weapon, used as a chiefs badge of authority. This is the conventionally carved *taiaha*, thus described by Archey (1937): "The Taiaha is a long, flat staff or blade, narrowing to a finely-carved, stylished human face, from which projects a sharp-pointed tongue four inches long. By means of the shellinlaid eyes of the head, the Taiaha could see and divine the intention of the enemy, thus adding hidden strength to the experience and fighting skill of its holder." He adds that this peculiar weapon, killing with its protruding tongue, was "bedecked with a circlet of red Kaka feathers and a fringe of dog's hair..."

Among certain tribes of the Northwest Coast of America, a similar weapon was in use, which was also conventionally carved to kill the enemy with its sharp projecting tongue, while, precisely as in New Zealand, it was more commonly used as a chief's insignia of rank, and as such carried at ceremonial dances. A specimen from the Makah division of the Nootka Indians is exhibited in the Northwest Indian Hall at the Chicago Museum of Natural History. A four feet long wooden staff ends in a stylized head fashioned from whale-bone, with eyes carved on each side, and with a mouth at the extremity, from which a pointed and flattened tongue projects several inches like a sharp spear-point, precisely as on the conventional *taiaha* of New Zealand. The analogy was strengthened by the circlet of feathers mixed with some short tow of red bast, which was fastened around the shaft at the neck of the stylized whale-bone head.

An exceedingly soft, round, and internal member like the tongue would not be very readily conceived as an instrument of slaughter, and the idea of stretching an enormous pointed tongue out of a flat stylized head, in such a way that it extends at an angle of 180 degrees to the neck, does not come naturally to the average artist. We are apparently dealing with an old inherited convention, based on the fact that an extended tongue is the symbol of war among both the Maori and the Northwest Coast Indians. Nor was the Maori idea of slaying with the tongue brought to Northwest America by Cook. He wrote from his visit of discovery among the Nootka of Vancouver Island (1784, Vol. II, p. 324):

"The tomahawk is a stone, six or eight inches long, pointed at one end, and the other end fixed into a handle of wood. This handle resembles the head and neck of the human figure; and the stone is fixed in the mouth, so as to represent an enormously large tongue. To make the resemblance still stronger, human hair is also fixed to it. This weapon they call Taaweesh..."

The fact that the Northwest Indian name for the local stone adze was recorded by Cook as *Taaweesh* is also noteworthy, since *Taawee* (*To'i*) is the Polynesians' name for their own adze, as it is pronounced in the Marquesas Group and other local dialects.

Plaited armour

Many Northwest Indian tribes wore in battle a special armour made from heavy mats of animal hide, or from wood lashed together with cord made of vegetable fibres. Goddard (1924) says of the latter type: "The second kind was composed of sticks, either flat or round, placed vertically and held securely by stout cord twined around horizontally. It was worn like a waistcoat, tied in place with leather strings on the right side. In addition, there were wooden pieces for the neck and face reaching up under the eyes, and above this, a helmet."

Their Polynesian island neighbours in Hawaii had an armour made from thick mats, as well as basketwork helmets; and the New Zealand Maori occasionally wore armour consisting of "several thicknesses of mats" (Linton 1923, p. 452). From the Society Islands Ellis (1829, Vol I, p. 300) wrote: "Some of the fighting men wore a kind of armour of network, formed by small cords, wound round the body and limbs, so tight, as merely to allow of the unencumbered exercise of the legs and arms, and not to impede the circulation of the blood: or the Ruuruu, a kind of wooden armour for the breast, back and sides, covered with successive folds of thick cloth, bound on with ropes."

Even the Samoans had a one-piece armoured suit, although with them it was very rare. (Linton 1923, p. 452.)

The occasional use of armour on the Polynesian islands has impressed some observers, as in this respect they resemble the Micronesians of the neighbouring Gilbert Islands, a fact which has been used to argue that the Polynesians arrived from these atolls. If we are to be consistent, the parallel occurrence of armour among the Northwest Indians must have an equal significance. The fact remains that it is, after all, the Gilbert Islands which are otherwise definitely influenced from Polynesia rather than vice versa (see p. 54 above), and that these marginal atolls are located directly where the prevailing northeasterly trade wind bears down from the Hawaiian group and the ocean off Northwest America.

The armour was only of casual use in both areas. More generally the Northwest Coast Kwakiutl and Haida, just like the Polynesian Maori, went into battle nude and barefeet, covered with oil and war-paint and with birds' feathers stuck in the hair.

Fortifications

Both the Northwest Indian and the Maori built elaborate palisades and fortifications of an uncommon design to protect their settlements from enemy assault. Similar *pa* or forts with ingeniously constructed and almost impenetrable wooden stockades were also observed in Polynesia proper, e. g. in the early Marquesas group. (Porter 1815, p. 82.) As Barbeau (1929) states: "The early navigators noticed, about 1780—1790, the striking resemblance between the fortresses of the Haidas, the Kwakiutl, and other coast natives, and the *hippah* of the New Zealand natives."

The construction of the fortified Maori *pa* had made a great impression upon the contemporary English voyagers, who referred to them as 'hippah' or 'heppah'. In the account of Captain Dixon's explorations along the Northwest Coast of America (1789, p. 205) we find an entry from July 7th, 1787 when he claimed the discovery of a small island off the seaward coast of the Queen Charlotte Group. It says:

"About two o'clock in the afternoon, being close in shore, we saw several canoes putting off, on which we shortened sail, and lay to for them, as the wind blew pretty fresh. The place these people came from had a very singular appearance, and on examining it narrowly, we plainly perceived that they lived in a very large hut, built on a small island, and well fortified after the manner of an Hippah, on which account we distinguished this place with the name of *Hippah Island*. The tribe who inhabit this hippah, ...have been at infinite pains in raising additional fences of rails and boards; so that I should think they cannot fail to repel any tribe that should dare to attack their fortification. ... Captain Dixon no sooner saw the fortified hut just mentioned, then his suspicion was strengthened, as it was, he said, built exactly on the plan of the Hippah of the savages at New Zealand."

The fortified seaboard settlements of some Northwest Coast Indians and the New Zealand Maori were thus so strikingly similar already at the time of discovery, that a Northwest Coast island has come to bear a name in special honour of the far away Maori villages.

Trophies of war

It cannot be denied that both the Northwest Indians and the Maori-Polynesians, although exceedingly hospitable, friendly, and munificent towards individual foreigners, were nevertheless war-loving, revengeful, and ferocious in inter-tribal dealings.

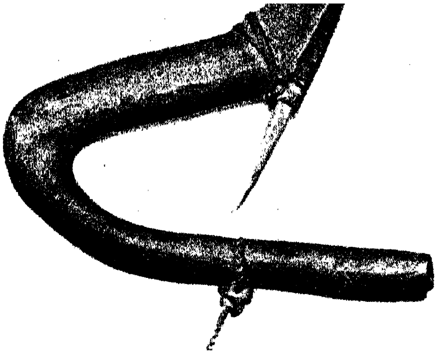
The trophies of war among the Northwest Indians differed from what was customary in the rest of North America, as they captured live prisoners to employ them and their descendants as slaves. In addition, we find locally another deviating practice: "Cutting off the head as a trophy is practised instead of scalping." (Bancroft 1875.) Dixon had already (1789, p. 218) observed from this coast that "the heads are always preserved, as standing trophies of victory".

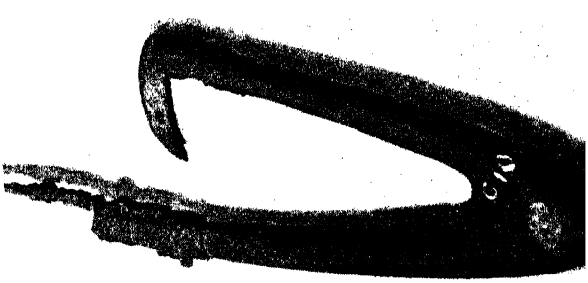
Turning again to the Maoris, we find here, too, that: "The trophies of war were slaves and preserved heads." (McCosh Clark 1896.) Finally, Schurtz (1895, p. 41) wrote of the Northwest Coast Indians: "In a tradition of a southern tribe heads were cut off and placed on the gable of a roof, precisely as in New Zealand."

Daily life

The peace-time occupations of the aborigines along the Northwest American coast with its adjoining archipelago included nothing that would set them much apart from the islanders of Polynesia, including New Zealand. Besides continuous work on the polished stone clubs, adzes and pestles, woodcarving was the great peace-time passion of all Northwest Indians and most Polynesians, including the Maori. The carved wooden household utensils and other artistically decorated artifacts of these two neolithic territories would be outstanding achievements among any people, and the similarity between the woodcarver's products of these two ethnographic areas is repeatedly stressed by observers. (E. g. Scouler 1841, p. 218; Jacobsen 1891; Schurtz 1895; Dreyer 1898, p. 374; Holmes 1919, p. 120; St. Johnston 1921, p. 210; etc.) But above all, the Northwest Indians and Maori-Polynesians were engaged in working on their canoes and in fishing at sea.

Hunting was of minor importance until the arrival of European fur-traders among the Kwakiutl and Haida islanders of the Northwest Coast Archipelago, and in Polynesia the only available game was the local *iole*, or native rat, which was probably brought from Melanesia, and hunted with small bows and arrows for its edible flesh. The Northwest Indians, and above all the island Kwakiutl, Nootka and Haida, constitute, like the Polynesian tribes, the most typical examples of a maritime fishing people.





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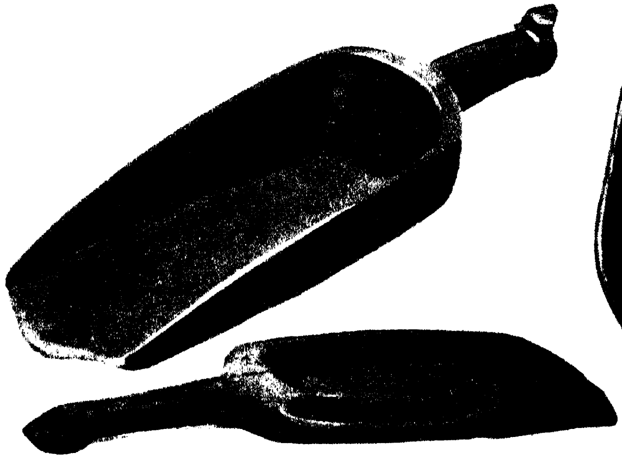

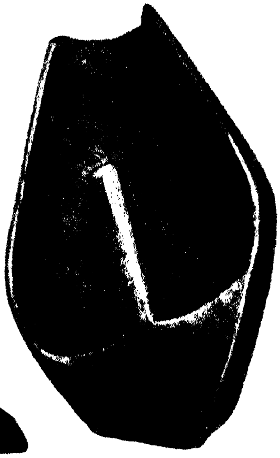

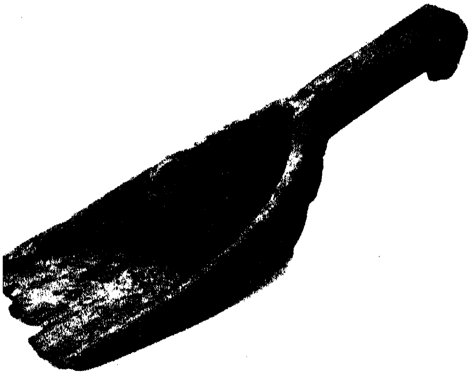

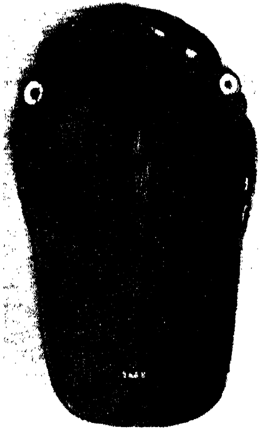

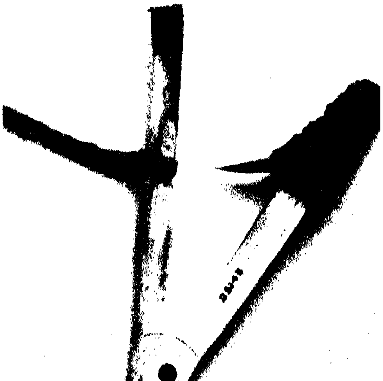

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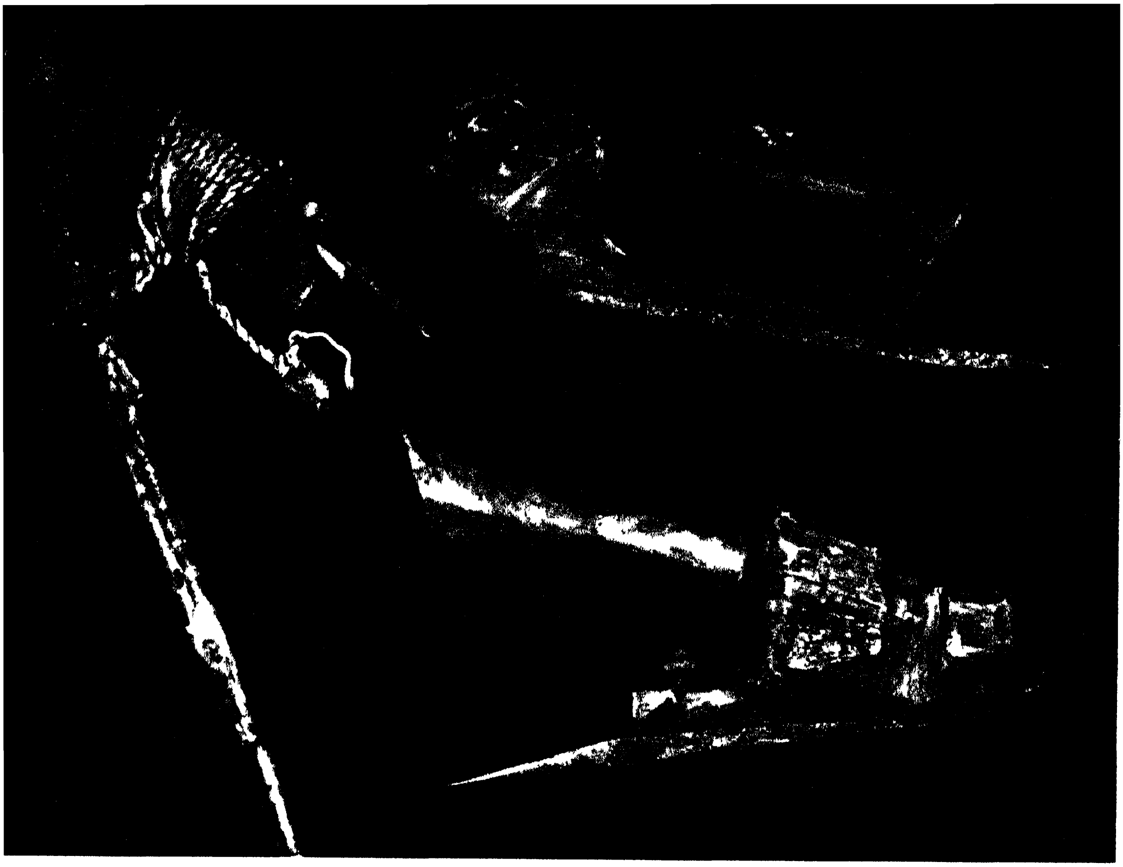
Composite wooden fish-hook with bone barb (**1**) from Marshall Islands and (**2**) the Northwest Coast Archipelago. (Both in *Mus. Anthrop., Univ. B.C.*) **3** Maori canoe bailers of inferior form. (From *Best 1925 a.*) **4** Northwest Indian canoe bailer, Larcom Island. (Photo: *B. C. Gov. Trav. Bur.*) **5** Developed form of Maori bailer with inlaid shell eyes. (Photo: *Auckland Mus. N. Z.*) **6** Composite Northwest Indian bone hook with inlaid shell eyes. (Photo: *C. Schuster.*)



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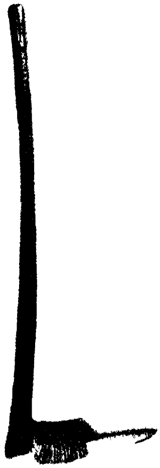

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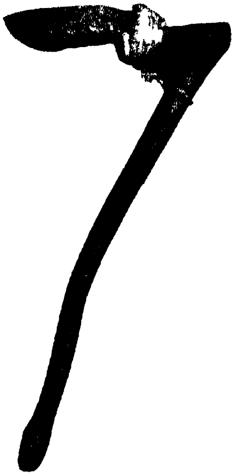

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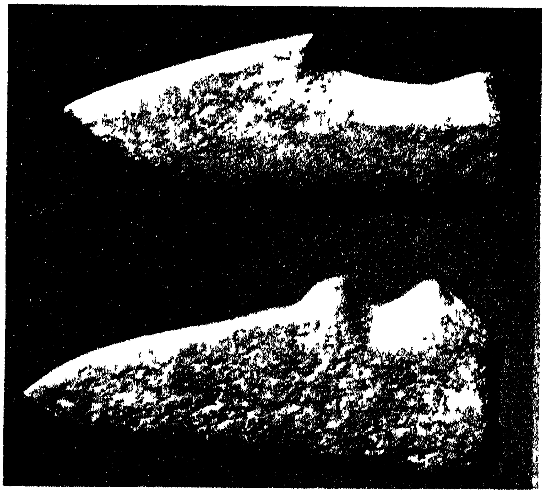

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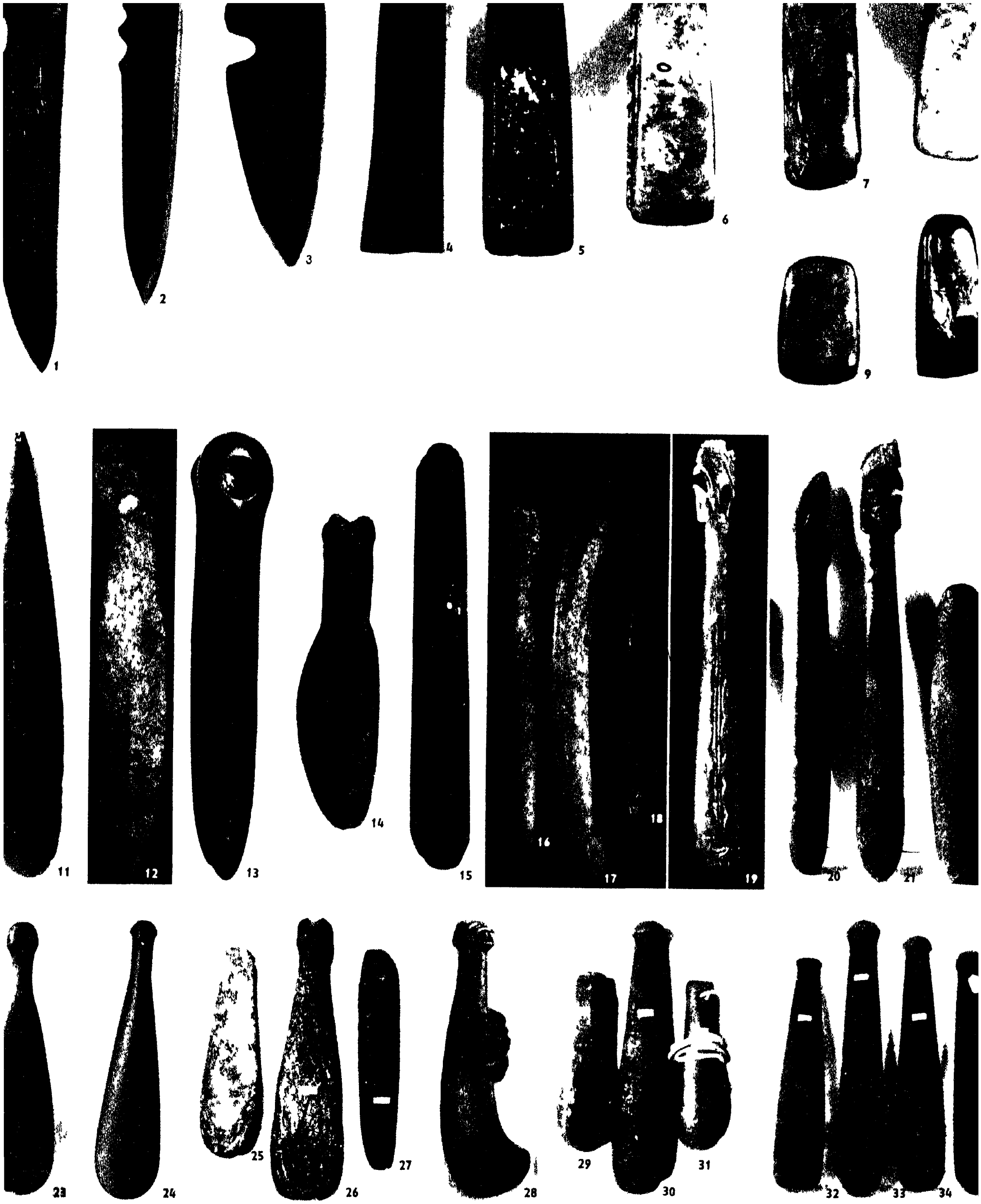
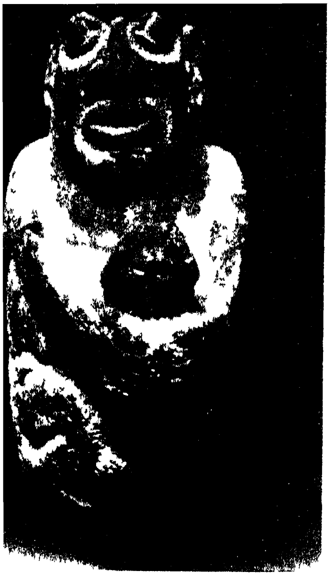
1 D-, inverted U-, and elbow-shaped adze-handles from the Northwest Coast Indians (with modern blades). Olson (1927-29) suggests that these three forms represent stages in the local evolution of the elbow-handled adze. (Photo: *Univ. of Washington, Seattle.*) Elbow-adzes with stone heads, **2** from the Northwest Coast Indians, (photo: *B.C. Gov. Trav. Bur.*) and **3, 4** from the New Zealand Maori, (photos: *Dominion Mus. Wellington* and *H. Hamilton.*) **5** Utility adze-head from Rapa (Polynesia) and the Northwest Coast. (As compared at the exhibition "Across the Pacific", *Amer. Mus. Nat. Hist.*)



Stone adze-heads, Northwest Coast (**1-10**). Stone and bone clubs, Northwest Coast (**11-22**), New Zealand and Chatham Islands (**23-28**), and Hawaii (**29-35**). Ceremonial adze, New Zealand (**36**) and Northwest Coast (**37**) as compared by exhibit "Across the Pacific". (Photo: 1-3, 5-10, 13-15 *B. C. Gov. Trav. Bur.*; 4, 12, 16-18 *Univ. of Washington, Seattle*; 11, 19, 20-22, 36, 37 *Amer. Mus. Nat. Hist.*; 23, 24, 28 *Dominion Mus., Wellington*; 25-27, 29-35 from *Brigham 1903 b.*) Club types in both areas correspond in size (e.g. fig. 13 – 15½″, fig. 24 – 16″).



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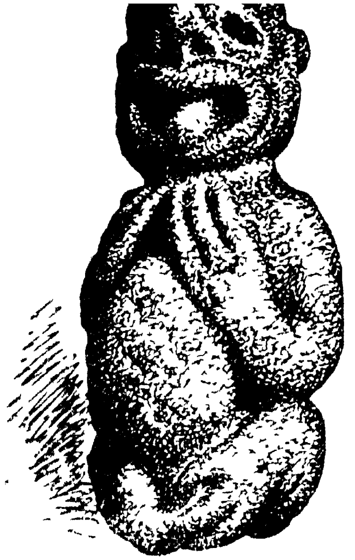

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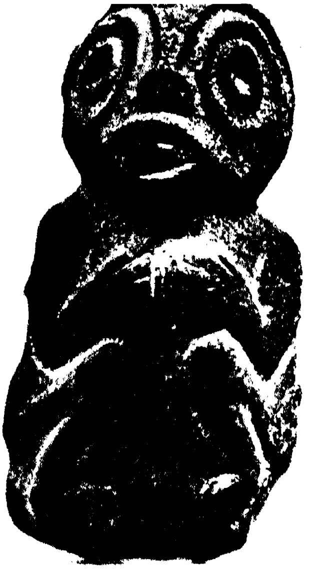

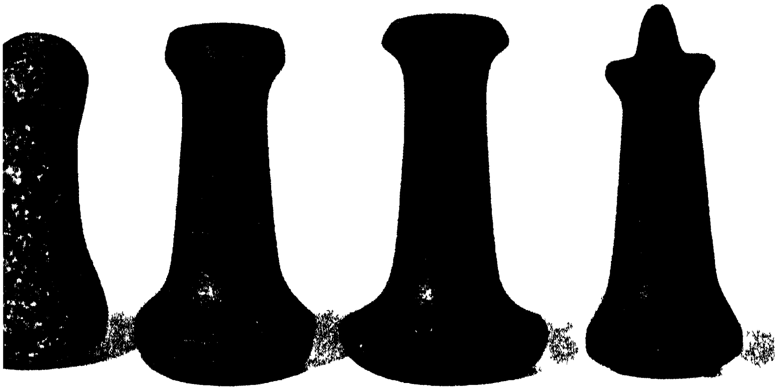

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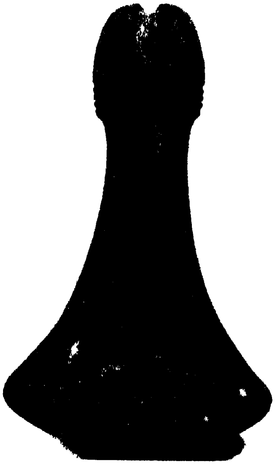

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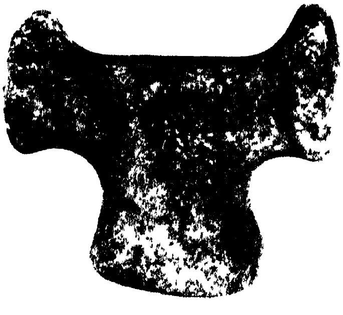
Flanked by two Northwest Indian stone images is a treasured Maori heirloom (**2**) said to have been brought from the tribal Fatherland. (After *Reischek 1924*.) **1** from Salish territory. (Photo: *T. P. O. Menzies*.) **2** found in the Kwakiutl Island settlement at Bella Bella Bay, near the Hakai Channel. (Photo: *Paalen 1943*.) **4** shows Salish and **6, 7** Haida samples of stone pestles from Northwest Coast. (Photo: *B. C. Gov. Trav. Bur.*) **5** specialized Marquesas Island specimen with phallic head. (Photo: *T. Heyerdahl*.)



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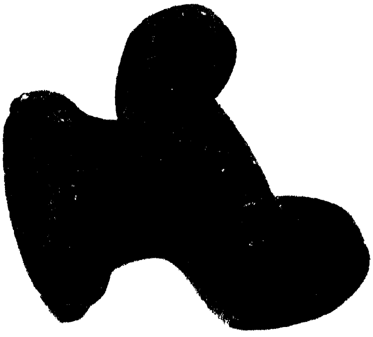

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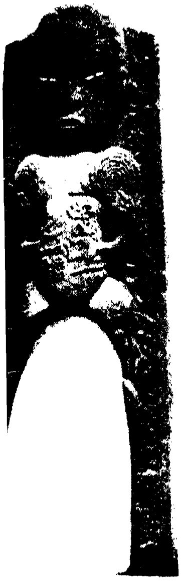

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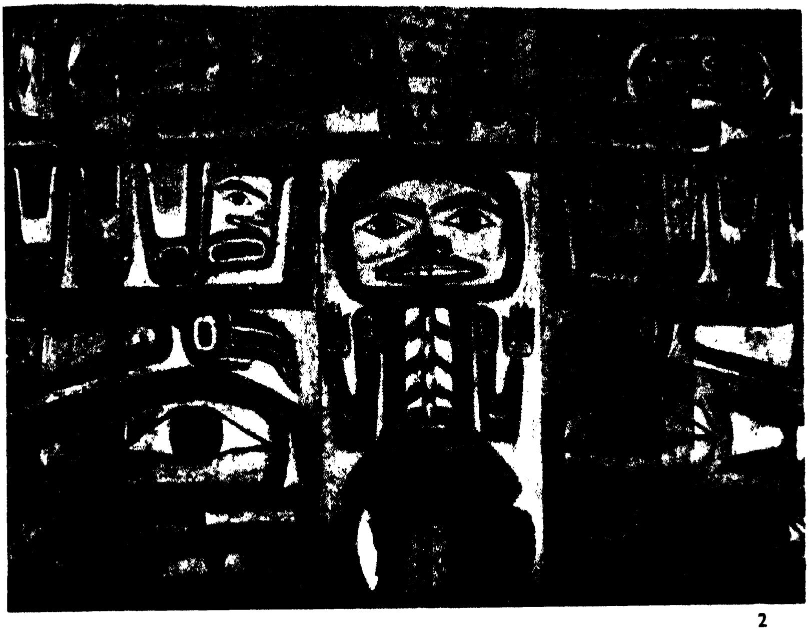

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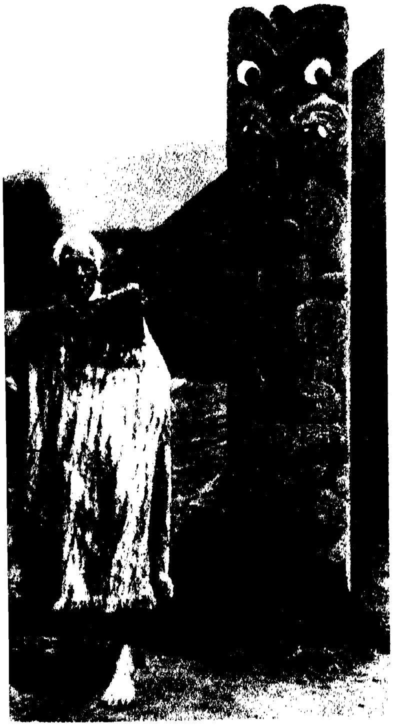

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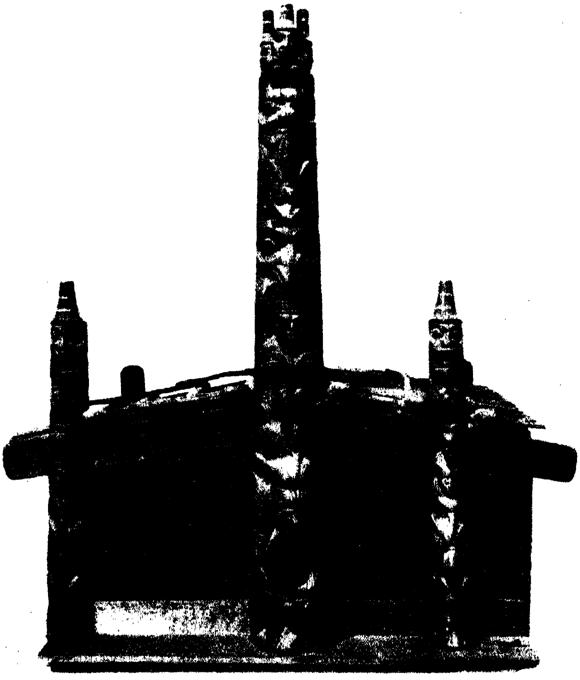

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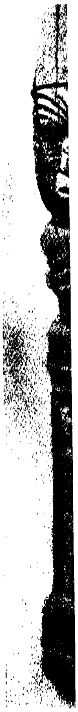
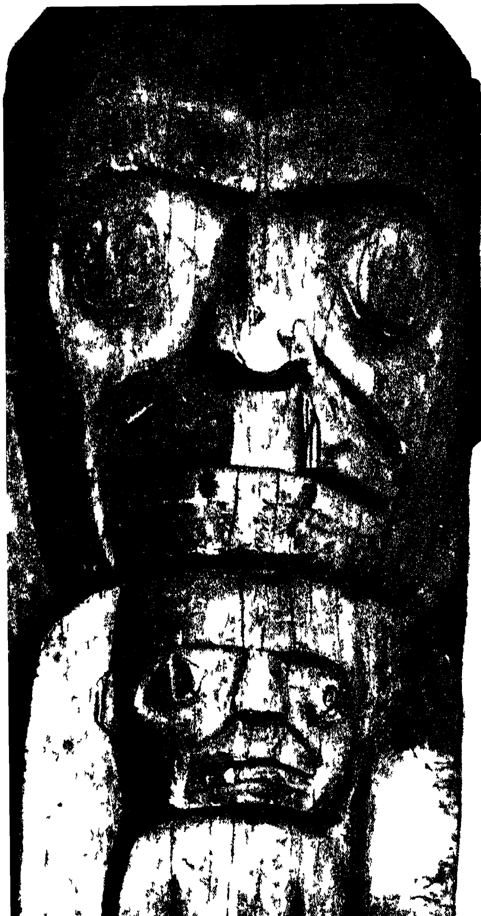


The New Zealand Maori (**1, 3**) and the Northwest Indians (**2, 5**) made doorways with entrance carved between the legs or through the womb of single or superimposed ancestral figures. (Photos: 1 *C. Schuster*; 2 *Emmons 1930*; 3 *Best 1927*; 5 *Amer. Mus. Nat. Hist.*) **4, 6** Maori house posts. (Photos: 4 *Andersen 1928*; 6 *Dominion* Mus.) **5** Model of Northwest Indian home with house posts. (Photo: *Amer. Mus. Nat. Hist.*) Compare headwear of 3, 5, 6.



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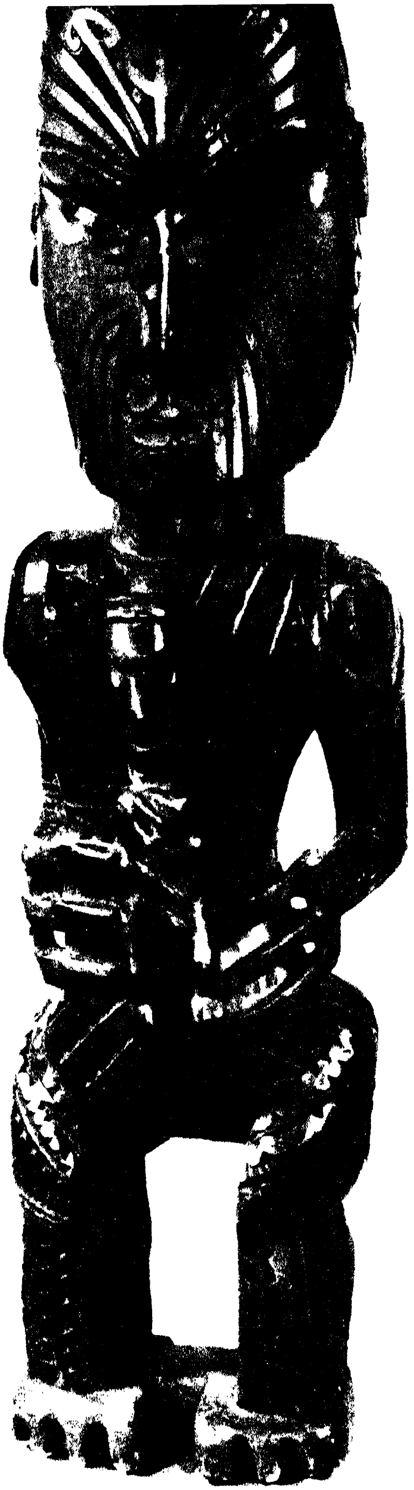
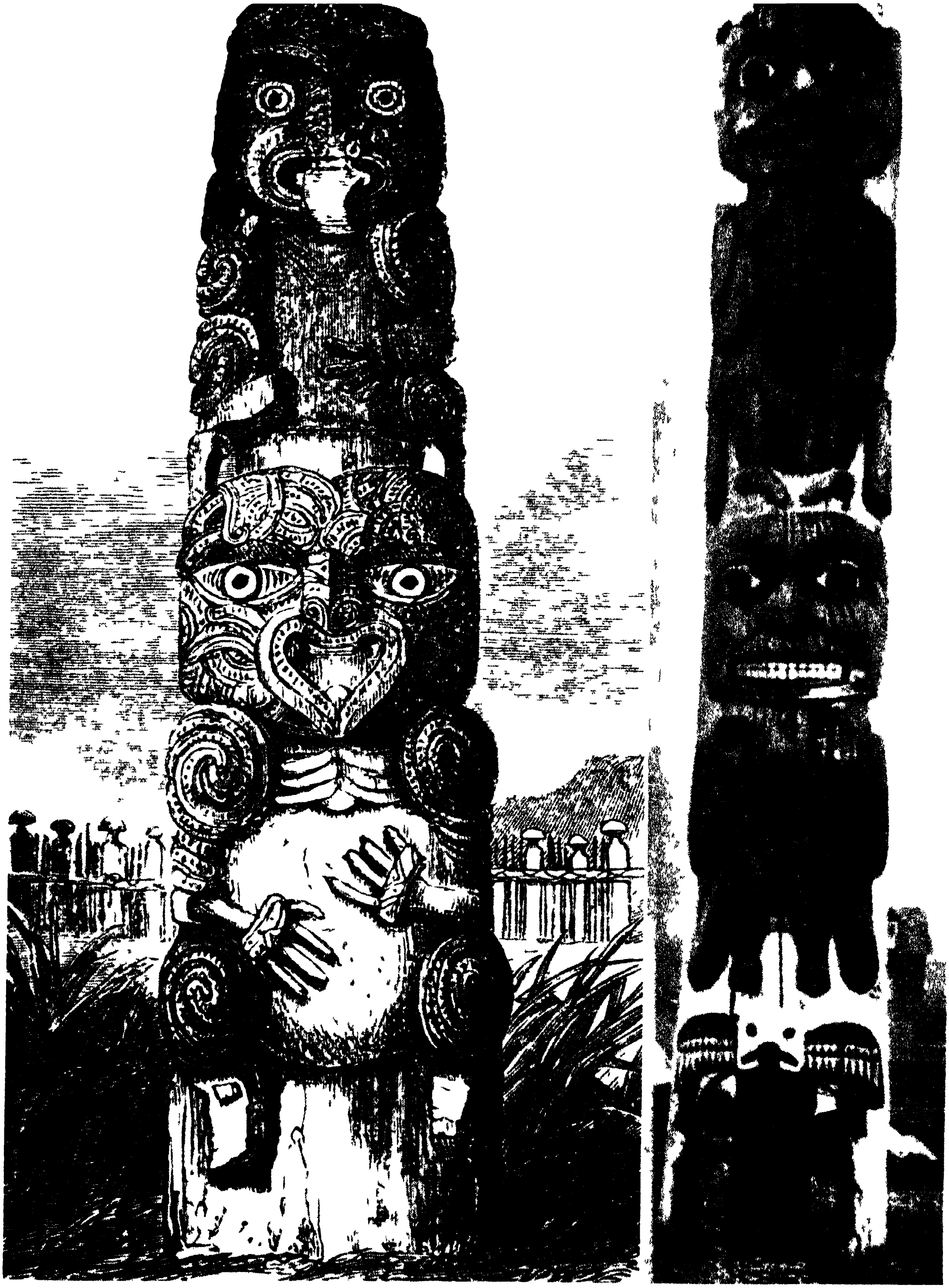


1 Kwakiutl house post from the Northwest Coast and **2** Maori house post from New Zealand, both in Brooklyn Museum, New York. (Courtesy, *Brooklyn Mus., N. Y.*)



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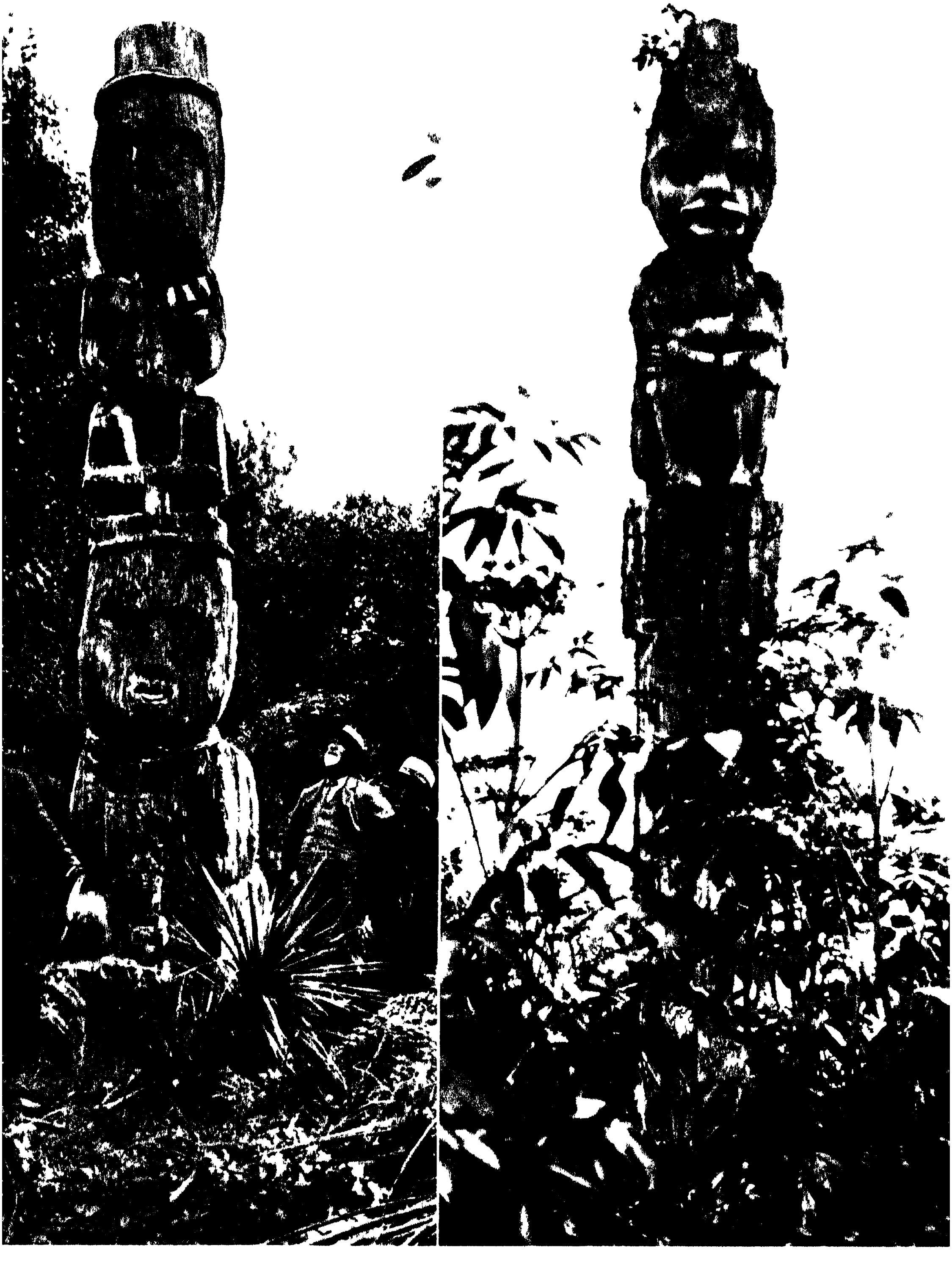
Carved wooden columns or "totem poles", **1** from New Zealand (from *Wood 1870*) and **2** from the Northwest Coast (from *Barbeau 1929*). Note protruding tongue of upper figures.



Carved wooden columns, **1** from New Zealand (photo: *J. McDonald*, courtesy *Dominion Mus.*), and **2** from the Northwest Coast (photo: *Amer. Mus. Nat. Hist.*). Note head ornament, claimed to be masculine top-knot.

Fishing

Both among the Northwest Indian and the Polynesian seamen, an important fishing tackle was a long three-pointed wooden spear. By throwing this without a line, and often for a distance of 20-30 yards, the local fishermen caught swimming fish with impressive skill, either from the shore or from their canoes at sea.

Huge drag-nets of tough inner bark or other vegetable fibres were also constructed in both areas, and the Maori-Polynesian type is a close replica of that which was in general use along the Northwest American coast.[1] I have seen Marquesas islanders making their cord precisely in the manner of the Bella Coola Indians, by twisting strips of inner bark between the hand and the thigh, the Marquesans substituting for the Northwest Coast cedar-bark the equally tough bark of their tropical *purao*-tree (Hibiscus). After the knotting of the huge nets is completed, light wood floats are fastened at regular intervals along the head of the net, while tooled and perforated stone sinkers are attached all along its foot. The grooved egg-formed as well as the perforated disk-shaped stone sinkers are among the most common archaeological finds in both regions, and they are quite indistinguishable in form.

The halibut and ruvettus hooks

Turning now to the third instrument for catching fish—the hook and line—we find in Polynesia, besides the simple curved shell hook, certain composite hooks, one of which is of unique design. Used locally for catching the ruvettus, this particular composite wooden fish-hook is referred to by Wissler (1927, p. 207) as "the most outstanding example of specialization in the fishing complex".

We are indepted to a zoologist for an interesting paper on this peculiar device. Gudger (1927), as a well-known ichthyologist, attacked the problem "as specialist in fishes and fishing, specially concerned with the identification of the *Ruvettus* hook, its method and its distribution". The wide distribution in mutually isolated parts of Polynesia of this very unusual type of hook suggests an inheritance from a common ancestral source. In his attempt to trace the geographic origin of the ruvettus hook, Gudger found it to extend right from the East Tuamotus through Central Polynesia and as far west as the Solomons and eastern Micronesia, islands plainly influenced by Polynesia. There it disappears completely. No similar form of hook is known in New Guinea, western Micronesia, Indonesia and the remainder of Asia. However, introducing an illustration of a Kwakiutl halibut hook, Gudger (*Ibid.*, p. 342) writes:

"The halibut hook of Alaska and the North-west Coast of North America so markedly resembles the *Ruvettus* hook of Oceania, that I have thought it well to figure and describe the two types of these hooks for comparison with *Ruvettus* hooks. ... Just what inferences are to be drawn from the remarkable resemblance in the fundamentals and construction in *Ruvettus* and halibut hooks I cannot say, since I am not an ethnologist and hence am untrained in such matters. It was Alexander Humboldt, I belive, who once commented upon the fact that under stress of similar needs people in widely separated parts of the earth had evolved similar apparatuses to meet those needs. The hooks in question possibly may be considered illustrative examples of this axiom. The two kinds of hooks are very similar in general makeup; they are made from forked limbs; have barbs similar in shape and position; are used at considerable depths and are provided with similar sinkers. Also, it being necessary to have the hooks float close to, but clear of the bottom, they are provided with floats for that purpose. Whether or not these things indicate a kindship in origin of their makers, or whether they are an illustration of Humboldt's axiom, I leave to the ethnologists to say. I consider that my function has been fulfilled in bringing these curious and interesting facts together."

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[1] Ellis (1829, Vol. I, p. 140) wrote from Tahiti: "Fishing nets were various; all were remarkably well made, and carefully preserved. ... Upea is the common name for net. The *upea ava*, or salmon net, is the most important, and is seldom possessed by any but the principal chiefs; it is sometimes forty fathoms long, and twelve or more feet deep."

It should be added that since there are no halibut in Polynesia nor any *ruvettus pretiosus* on the Northwest Coast, the hooks in question are not very likely to have developed simply from the stress of similar needs, wherefore their resemblance is the more noteworthy. It should also be stressed that a few specimens of the ruvettus hook are known to have been brought along by the Maori to New Zealand, where Polynesian ruvettus are unknown. (Burrows 1938, p. 9.)

Nowhere outside the coastal territory of Northwest America, and the adjacent but scattered oceanic islands of the Polynesian-influenced East Pacific, are similar hooks found. Commenting on that fact Wissler (1927, p. 207), after declaring that Gudger's work "deserves the lasting appreciation of all interested in Pacific anthropology", stressed: "We have, therefore, what appears as a single diffuson area in which there is a basic trait-concept with a simple type of appliance and a more complicated variant, all suggesting a common center of dispersal. It is in this setting that we see the importance of Doctor Gudger's contribution, emphasizing the value of intensive studies involving not only the mere trait as objectively observed, but giving due consideration to the factors in the environment to which the trait under consideration is adjusted."

Since available evidence shows a near ethnological correspondence in fishing devices, in spite of a notable zoological divergence in marine fauna, we may well agree with Wissler that a common centre of cultural dispersal is a more suggestive interpretation than the stress of similar practical needs.

As might be expected, the analogies between these fish-hooks had not passed unnoticed by anthropologists until the appearance of Gudger's monograph. Two comparative specimens of composite wooden hooks with bone points of the same type as here discussed, one from Northwest America, the other from Polynesia, had already been exhibited at the meeting of the Anthropological Institute in London on Feb. 12th, 1884. (Young 1885, p. 84.) As the stress of similar needs seems to be an unconvincing argument where divergant species of fish occur, other explanations have been attempted to account for the phenomenon. As Dixon (1933, p. 229) says in respect of the wooden halibut hooks of the Northwest Indians: "The analogy between these hooks and the Ruvettus and shark hooks of the Pacific Islands has frequently been pointed out, and the claim has been made that the American hooks were directly derived from the Oceanic form."

But Polynesian fishermen would surely not sail up the whole coast of Northwest America, spreading their ideas of hooks as they went, without leaving also the conception of the outrigger.

Inland fisheries

An interesting feature of Northwest Indian fishing, which for natural reasons could not be followed up in Polynesia, was the British Columbian salmon-fishing. In the Northwest Indian habitat, at the time of the great salmon migrations, large-scale fishing was pursued up the rivers inland. The fish were caught in enormous quantities by means of spears and drag-nets, in addition to which the local Indians had invented ingenious salmon weirs with weels.

In New Zealand we find a striking analogy; as the Maori had in use precisely the same weirs, but there they were used to catch the local eel. Like the salmon of the Northwest Coast, the eel of New Zealand enter the rivers in great abundance at the time of their migrations, and it was the object of one of the most important Maori fisheries, especially among the inland tribes. The salmon weirs of the Northwest Indians reappeared among the Maori as eel weirs, constructed on exactly the same plan, with solid submerged fences that opened into the weels. (Downes 1918.) Even the typical Northwest Indian drying huts erected on the Northwest Coast for the salmon were repeated among the Maori for their eels, and thus described by Bachman (1931): "Peculiar drying huts in the shape of high and long wooden sheds were found on the islands, their roofs being supported by poles and bars. The eels were hung to dry on suspended crosspoles, and there were more than a thousand to each eel-hut."

The absence of kite fishing in Polynesia

We will return later (Part IX) to the simple and composite fish hooks, but we cannot leave the Polynesian fishing equipment without a reference to the suggestive Pacific distribution of kite fishing. The kite itself, as a culture element, had a very wide prehistoric distribution both on the Asiatic and the American side of the Pacific basin, and was also known in the various sections of the oceanic islands, for example in Hawaii, the Marquesas, the Society Islands, and New Zealand (Linton 1923, p. 410) of Polynesia, as well as in Melanesia proper, New Guinea, and Micronesia. As such, the almost universal distribution of the kite in the Pacific is obviously without value in the tracing of Polynesian migrations. But Anell (1950), referring to works of Balfour (1913), Plischke (1922), and Chadwick (1931), has called my attention to the added value of this wide prehistoric existence of the kite, through the fact that the specific employment of kites *for fishing purpose* has a marked and restricted geographic distribution in the Pacific. Anell's view is that the early home of kite fishing was Indonesia, probably somewhere in the Molucca Islands, whence the custom spread as far east into the semi-continental part of the Pacific as to the Solomon Islands and Santa Cruz in Melanesia, but no further. From Indonesia kite fishing spread as well, like so many other culture traits, to the nearby Palaus and adjoining regions of the western half of Micronesia, but no further.

Thus, in eastern Micronesia and eastern Melanesia kite fishing was unknown, and nowhere in Polynesia did it occur. We have, therefore, a marked geographic diffusion area stretching eastwards from Indonesia but losing impetus far short of Polynesia. Kite fishing, coming in from the west, ends in roughly the same area where the wooden ruvettus hook disappeared when coming in from the American side.

Plischke, in his attempt to explain the absence of kite fishing in Polynesia, argues that no Polynesian would profane a culture element which so often had a ritual use and existed in mythology. To me, this would only show an added difference in the purpose of using the kite among the peoples concerned, and even Anell, who believes in the eastward migration doctrine, shows how unsatisfactory Plischke's theory is as an explanation of the geographical distribution, as the kite is used equally for rituals and fishing in the Palaus of western Micronesia. We may also note that Handy (1932, p. 58), quoting Corney from the early Society Islands, wrote: "Kites have been used for towing rafts of timber and bamboos at this part of the coast..." If kites could be used for towing rafts, kite-fishing could not be a worse 'profanation'.

Anell (*Ibid.*), who is engaged on research into the fish-hooks of Polynesia, stresses that few if any of the Polynesian fishing tackles can be traced back to Indonesia, an incongruity which he can only explain by the theory that the early introduction of metal in Indonesia can have destroyed earlier theoretical culture elements that might have been more like those existing in Polynesia.

The idea of covering up the absence of solid arguments by suggesting an early prehistoric introduction of iron may at a pinch be resorted to as a way out, but it has little value in the tracing of Polynesian migrations.

Women's art limited in both areas

The limited nature of women's contribution to art on the Northwest Coast of America is emphasized by Goddard (1924).

"The men," he writes, "make the canoes, erect the houses, manufacture the implements employed in fishing and hunting, and provide the wooden dishes for household use. ... His art on the N. W. Coast takes the form of carving in the round and relief, and of painting. ... Since art exists mainly as the embellishment of objects of utility, its development in any one region is largely dependant upon the general industries practised there. On the Northwest Coast, pottery is entirely lacking and clay, the material most readily modeled, is not employed in art. The household vessels are mostly made of wood; wood carving, therefore, is the most prominent art manifestation. ... On the Northwest Coast where there is no pottery and where clothing is scanty, woman's art contribution is rather limited."

The same statement is valid for Polynesia. We have shown that throughout the Polynesian islands including New Zealand, both pottery-making and the use of the loom are as unknown as among the Indians of the Northwest American Coast. Women's contribution to art is accordingly affected.

The earth-oven

The absence of pottery had a great effect on the Northwest Indian preparation of food. As a principal substitute, the local Indians constructed the so-called 'earth-oven'. Dreyer (1898, p. 128) says: "Various shell-fish and octopuses were eaten with delight. The long tentacles of the latter were eaten when cooked in holes in the ground inside lined with heated stones."

"The roots were cooked by steaming in underground ovens," says Goddard (1924) from the same coast.

This same Northwest American earth-oven recurs in Polynesia, where it is universally used for baking the food instead of boiling it in Indonesian fashion in pottery jars. The Northwest Indian and Polynesian earth-oven may be a pile of heated stones above the ground, but generally it is, in both areas, a hole sunk in the ground and lined inside with stones. A strong fire is lit in the hole, and when the stones are sufficiently heated, the embers and ashes are removed and the food is put in. The opening is then covered with leaves, seaweed, or wet mats, until the food is sufficiently baked.

J. M. Brown (1924, p. 265) refers to the earth-oven as follows: "... it is one of the most distinctive marks of the culture of the Polynesians and went with them wherever they went. It was probably bred in the frozen soil of the wintry north, and belonging to the natives of the northwest coast of America, as it does, it is one of the cues that seem to indicate affinity between them and the Polynesians."

The boiler

The only means of boiling that was known in aboriginal Polynesia was by dropping red-hot stones into water contained in a wooden tray or basket. This method was occasionally used for boiling arrow-root and similar plant products. (Ellis 1829, Vol I, p. 49.) Referring to this rather unusual custom, Allen (1884) says: "Tylor also mentions, in his work on 'Primitive Culture', that the boilers (by heated stones placed in breakable baskets) inhabit the northern half of North America, extending far down on the western side; but not further than New England on the Eastern. This singular method of cooking is only known to exist in the northeast corner of Asia, but is universal throughout Polynesia."

If the boiler has spread to these three areas through human migration, the northern half of North America may well have received the idea from the northeast corner of Asia, and the question is thereby reduced to: From where did the boiler spread to Polynesia?

Bark-cloth manufacture

We have mentioned earlier that neither Northwest Indians nor Maori-Polynesians were acquainted with the loom, and that bark-cloth was manufactured locally instead of fabrics woven from wool, cotton, and silk. Bark-cloth manufacture and basketry plaiting were accordingly the most important aspects of women's contribution to art in these two regions.

We have stated that the making of bark-cloth probably had a wide circum-Pacific distribution in early times, to judge from its sporadic occurrence among certain mutually isolated tribes in Indonesia, Melanesia, North and South America, and Polynesia. Bark-cloth fabrics are known from early archaeological strata on the desert coast of Pacific South America. Apart from the interior tribes of Celebes and certain aboriginal Mexican cultures, none of which had access to the Polynesian ocean, the only culture peoples of considerable importance which still made bark-cloth until interrupted by the introduction of European culture were the Northwest Coast Indians and the Polynesians. The custom was also adhered to by the more primitive Melanesian islanders.

When we enter on a comparison of the local types of bark-cloth, we have to take environmental conditions into due consideration. In spite of the high latitude, the climate of the Northwest Indian habitat is mild due to the warm current from the Philippines and Japan, and the temperature does therefore not affect profoundly the local demand for warm clothing. But the species of trees and shrubs that grow on the Queen Charlotte Islands, Vancouver, and the neighbouring island-dotted Northwest American coast vary markedly from those of the Polynesian islands, including even New Zealand. In geography and vegetation, Melanesia and Polynesia show the closest agreement. Thus, whereas yellow cedar bark was ever-present and very suitable for bark-cloth manufacture in the Northwest Coast Archipelago, this tree was absent from Polynesia, where the islanders had access instead to the bark and fibres of a great variety of tropical trees and shrubs unknown in the high latitudes of the North Pacific.

Settlers of the Hawaiian group would soon after their arrival find suitable raw material in the *mamaki* (or *mamake*) tree (*Pipturus spp.*), and the *oloa* shrub (*Neraudia melastomaefolia*), which were indigenous to these islands. Better and far more suitable trees were obtained in Central Polynesia from marginal contact with Fiji and possibly other Melanesian islands. The Melanesians grew the paper mulberry tree (*Broussonetia papyrifera*), and the breadfruit tree (*Artocarpus incisa* or *A. altilis*), which of all Pacific plants yielded the most favourable bark for the manufacture of fabrics. Unknown in Micronesia, these trees did not grow in Polynesia either until imported by sea from the volcanic islands of Melanesia, where they were in use as principal culture plants. These, with the *hau* (*Hibiscus tiliaceus*), the *milo* (*Thespesia populnea*), and perhaps two or three more, were secondarily introduced to Hawaii from Central Polynesia, and became the principal bark-yielding trees for the local manufacture of bark cloth. (See also Ball 1929, p. 5.)

The bark of the paper mulberry and breadfruit trees provided the principal raw materials for fabrics throughout most of Central Polynesia, but not in New Zealand and the Chatham Islands, where again these favourable species would not grow, so that other local barks and flax had to be resorted to.

Differences or similarities in the choice of barks and plant fibres are thus decided by botanical rather than anthropological distribution. For botanical reasons, Central Polynesia and Melanesia concur where Central Polynesia and New Zealand differ.

All bark and flax available to the Northwest Indians have fibres extending parallel with the growth of the plant, and the same is the case with the vegetation available to the Maori of New Zealand. Both peoples, in order to obtain a coherent fabric, had to plait the separate fibres together by primitive "finger-weaving", since they had no loom. In tropical Polynesia, this finger-weaving was rendered superfluous by the consistency of the inner bark of the breadfruit and the paper mulberry tree, which had fibres running as a network in all directions.

When the women of tropical and semi-tropical Polynesia set about making their *tapa*, or bark-cloth, suitable sheets of inner bark are taken off the selected tree and soaked in shallow water for several days. The wet sheets of bark are then placed on a smooth stone and beaten with a special grooved wooden mallet, generally known as a "tapa-beater". The tapa-beater, together with the already described polished poi-pounder, constitute the principal tools of Polynesian women, and are of the same importance to them as are the canoe and the elbow-adze to their men. As a result of the beating, the bark gradually trans-forms itself into a thin, stiff, porous paper, which may be thickened simply by beating several sheets together. The bark-cloth finally obtained is shaped to form the blankets worn by the Polynesian people.

In view of the difference of raw material, Goddard's (1924) description of cloth-making procedure on the Northwest Coast is highly suggestive: "The Kwakiutl weave blankets and capes of the bark of the yellow cedar. The inner bark is taken from trees in July and soaked for ten days by weighting it down in still, shallow, salt water. It is then beaten across the grain by an implement, in shape and appearance like the tapa beaters of Polynesia, made from the bone of a whale." It should be added that the Kwakiutl cedar-bark beater is not universally of whale-bone, but just as often of wood, and that the grooved wooden bark-beaters from Northwest America and Polynesia are of the same size and cross-section, with specimens so much alike that a proper differentiation of Polynesian and American forms is hardly possible.

Frequent comparisons have been drawn between the bark beaters from various parts of the Pacific. Jenness (1932) shows how the early voyagers compared the "cedar-bark beaters" of the Northwest American Coast with the "tapa-cloth beaters" of Central Polynesia, but he rejects a connection, arguing that similar bark-beaters had a wide distribution inside aboriginal America. This, however, should not affect the possible spread of the same implement *out* of America.

The difference between Oceanic tapa-blankets and the cedar-bark blankets of Northwest America is the work of nature and not the work of man. We may easily perceive how Kwakiutl deep-sea canoes, landing with the current in Hawaii, would take the voyaging families away from their familiar forests of cedar and giant pine, and bring them to a habitat where different shrubs and trees abound. Even before meeting with Melanesian tribes, the newcomers would replace the cedar-bark by testing the bark of all the newly discovered trees, and the tapa would come into being as soon as they applied their customary procedure to the right kind of tropical tree.

In the same way, nature reversed the process when the same people came out of the tropical belt to settle New Zealand. With the loss of the practical tapa-yielding trees of the tropics, the Maori had to resume the more laborious system of finger-weaving.

The similarity of the final results to those of the original starting point is not to be mistaken. Although Söderström (1939, p. 54) agrees with Nevermann that no finger-weaving of a similar nature to that of the Maori is known from 'Indo-Oceania', observers since the days of the early voyagers refer to its existence in Northwest America. As early as in 1778, Cook (1784, Vol. II, p. 280), on his visit of discovery among the Nootka tribes of Vancouver Island, wrote: "In most of the houses were women at work, making dresses of the plant or bark before mentioned, which they executed exactly in the same manner that the New Zealanders manufacture their cloth." This strong and significant statement was made by Cook before European influence had had any chance of affecting the local dress and working procedures.

A connoisseur of Northwest Coast culture, Niblack (1888), wrote about a century later: "The cloaks of shredded inner bark in the National Museum from New Zealand and the Queen Charlotte Islands are so much alike, that it takes a close inspection to distinguish them."

Observers who have taken it for granted that the Maori came straight out of Indonesia have found the similarity of the Maori and Northwest Coast Indian cloaks to be misleading and quite irrelevant. Buck (1926 b), in a special publication on *The Evolution of Maori Clothing*, failed to find any correspondence in Indonesian cloth manufacture and was led, as stated above, to suggest that the Maori-Polynesians had deliberately rejected the Old World loom after their departure from Indonesia, and that the Maoris invented their own finger-weaving technique after settling New Zealand, thus freeing themselves "from the drudgery of another unnecessary art, whilst their neighbours of lesser mentality remained slaves to the loom."

In his attempt to establish the peculiar Maori manufacture of cloth as a local invention in New Zealand, Buck (*Ibid.*) devotes seven pages to an effort to show that the Maori technique might have evolved independent of the technique otherwise typical of the Indians on the Northwest Coast of America. He admits: "Both areas used unspun fibre and simple contrivances to suspend the warps. In both, the technique was based on the singlepair twine in basketry and the weft rows were spaced. The fabric was worked downwards with the fingers. The metod of weaving the cloak or mantle was also similar."

In analysing this correspondence, for which he saw no obvious reason, Buck rejected the similarity altogether by stating (*Ibid.*, p. 211) that the main feature in common between the Northwest Indian and Maori techniques is the use of the single-pair twine; for single-pair twining in soft material necessitates suspension and downward finger weaving; and the use of short lengths of unspun fibre also necessitates the joining of warps by overlapping. "Thus the main resemblances are primarily due to the use of the twining technique. Single-pair twining is so widely spread that there is no need to account for its presence in the two areas by attributing it to remote contact or later diffusion."

Thus he endeavours to pull to pieces the whole similarity both of the technique and of the bark-cloth garments produced. Buck's arguments were later quoted by Sayce (1933, p. 258), and were thus carried into the domain of general ethnology. One can only wonder: if this similarity is due *only* to a common Maori-Northwest Indian use of single-pair twining technique, and that technique again is so widely spread, why then do we not find a similar cloth also in Indonesia or other parts of Asia? Why not anywhere else in the world but just in the same continental archipelago of Northwest America, where so many other correspondences to Maori physical types, arts and crafts have already been found?

Dress and ornaments

Jacobsen (1891, p. 162), intimately acquainted with the products of Northwest Indian material culture, wrote about the local aborigines: "...their articles of clothing look almost entirely like those of the New Zealand Maori, in form as well as in fabric and manufacturing method. The similarity is so great that some of the blankets from the two regions, when hung up beside each other, can hardly be distinguished. Furthermore, the Indians wear tippet-like collars, which in their form exactly resemble the feather-capes of the Hawaiian islanders."

It is in itself a noteworthy analogy that the Northwest Indians, like the Maori-Polynesians, were "blanket-people". When the bark-cloth was manufactured, the products of each people not only looked alike, but were also worn alike. The bark-blanket of the Maori-Polynesians was simply wrapped around the body as a rectangular mantle, passing under the right arm and being tied over the left shoulder, or vice versa, but hanging down to the bare legs. The same fashion was customary among the Northwest Indians. Cook (1784, Vol. II, p. 304) was the first to describe it from Vancouver Island: "Their common dress is a flaxen garment, or mantle, ... It passes under the left arm, and is tied over the right shoulder, ..."

The finger-woven blankets worn by the men are not alone in showing a direct analogy between the two areas; the women's apron, too, as worn by Kwakiutl tribes, was identical with the corresponding female apron of the Maori. In both areas the women made them from threads of shredded bark that were folded over a simple waist-band and then sewed together beneath this cord, so that the threads fell down loosely to the knees.

Steele (1930, pp. 310-314) discusses the origin of the Maori bone sewing-needle, with fine eye, which reappears on various Polynesian islands. He disproves its European origin by referring to known archaeological specimens. Sewing needles of human bone with fine eye and of identical size with those of Polynesia are well known in aboriginal America, and a considerable number of prehistoric specimens have been excavated locally from ancient Northwest Coast shell middens. (Vancouver City Museum.)

Rain-cloaks

In rainy weather a rather remarkable rain-cloak was worn by the Maori, constructed like a thatch. Niblack (1888) wrote from the North-west Indian habitat: "Along the whole coast a peculiar form of cloak was worn in rainy weather to shed water. Dixon (1787) says of them, as seen at Sitka: 'I had no opportunity of examining them minutely, but they appear to be made of reeds, sewed very closely together, and I was told by one of our gentlemen who was with Captain Cook during his last voyage that they were exactly the same with those worn by the inhabitants of New Zealand.'"

Daily garb

Goddard (1924) calls special attention to the fact that among the Northwest Indians the men had no feeling of shame in being uncovered, a characteristic which is rather uncommon among related peoples of corresponding intellectual standards. During the summer the men used to go about in the village quite unclothed. The same was also the case in Polynesia. In both areas the bark-blankets were chiefly worn on ceremonial occasions, or when the weather was cold.

The Polynesians, like so many aboriginal peoples, had naturally hardened soles to their feet and were able to walk barefoot and without difficulty over sharp lava rocks and coral reefs. In this respect they differ from nearly all North American Indians, but not from those on the Northwest Coast. Goddard (*Ibid.*,) stresses that the Northwest Indian tribes had not developed any sort of foot-wear. Other aboriginal North Americans all manufactured various types of moccasins and sandals for protection against the rough surface, but the tribes of the Northwest Coast always went barefoot. The reason was that they were not accustomed to landtravel, but were almost constantly at sea in their canoes.

Thus in daily life the fishermen in both these ethnographic areas were in the habit of walking about barefoot and nude, except on the head, where, again in both areas, they wore large-brimmed and skilfully plaited hats. In colder weather and on ceremonial occasions they wrapped themselves up, as stated above, in the same way and in the same sort of bark-blankets, while in rain the same type of thatched rain-cloaks were worn.

There is thus no incongruity in the main local fashions and manner of dress. We shall now consider the means of more direct ornamentation.

Dressing the hair

As to the masculine coiffure, some tribes in both regions cut their hair close to the head, but Vancouver (1798) and other early voyagers describe how, among several Northwest Indian tribes, the men let their hair grow to its full length, kept in neat and well combed and tied it in a top-knot at the summit of the head. Others tied it at the forehead. The Kwakiutl were among the many tribes who maintained top-knots as the masculine form of hair-do, and Kwakiutl men wore beautiful combs to adorn them. The Provincial Museum in Victoria and the City Museum in Vancouver contain a collection of such Kwakiutl hair-combs, represented by three different types. One type was carved from thin plates of whale-bone, another from a thin single plate of wood, whereas the third was a composite comb formed by plaiting together a row of separate wooden tines.

In his handbook on the Maori, Archey (1937) writes from New Zealand: "For hair-combs, with their neatly curved edge and deft touch of decoration, whale's bone provided the requisite thin plates; combs were also made from a flat piece of wood, or from slender wooden tines plaited together. They were worn behind the tightly-bound and clipped top-knot, which was the usual type of masculine coiffure."

Here and there, over a number of widely separated groups as far east as Easter Island (Roggeween 1722, p. 15), the early voyagers describe the same peculiar Polynesian form of masculine coiffure, with men wearing their hair tied in knots on the tops of their heads.

Predilection for reddening hair and skin

Dixon (1789, p. 238) states that the long black hair of the Northwest Indians would have been an ornament to them "were it not for the large quantities of grease and red oker constantly rubbed into it, ..." And Cook (1784, Vol. II, p. 305) says of the tribes at Vancouver Island that "they rub their bodies constantly over with a red paint, of a clayey or coarse ochry substance, mixed with oil, ..."

Polack (1838, Vol. I, p. 394) writes similarly from New Zealand: "The red ochreous earth called *kokowai*, is in great request among the beaux and belles of the land, ... This material of embellishment is rubbed over the body from the head, including often the hair, to the feet. This rubrication is fixed by the oil extracted from the liver of a shark..."

The same custom was observed in Hawaii and other islands.

Further ornamentation

Jacobsen (1891, p. 43) points to the custom in both Northwest America and Polynesia of wearing red rings of bast as ornaments to the head and waist. We may add the even more characteristic wearing of feather plumes in the hair (Cook 1784, Vol. II, p. 232), a custom which extended from Northwest America to Hawaii and New Zealand; or the practice of inserting down and feathers in the bark-cloth cloaks, which has the same distribution; and finally the idea of wearing as decoration dashing fringes of human hair, as is done especially among the Marquesans and the Kwakiutl tribes.

Head-flattening

As adornment of a permanent nature may be mentioned the rather widespread custom of artificial head-flattening in babyhood, which occurs sporadically among many peoples, and appeared also among the Northwest Indians and the Polynesians. The Kwakiutl seem to have favoured the so-called "sugar-loaf" shape of the head, but a long tapering skull, like that on the artificially deformed Marquesan head, prevailed among the Nootka on the same island, and more especially among the Salish of the mainland, commonly referred to as the "Flathead-Indians". In the Society Islands the frontal and the occipital bones of the skull were frequently pressed together, which again gave an effect more similar to that favoured among the Kwakiutl. An internal variation in the head-flattening style is therefore seen within both these geographical areas.

Tattoo

Another permanent mutilation found sporadically among Yellow-brown tribes on both sides of the Pacific, was the custom of tattooing. This practice reached an unsurpassed importance among the Polynesian islanders. Thus, in the Marquesas Group and Easter Island the entire body, with face and limbs, were covered by conventional designs obtained through a painful operation performed, as in America, by introducing powdered charcoal under the skin by means of a sharp chisel of bone or hard wood. (Handy 1923; Emory 1946; Goddard 1924.) Although to a less drastic degree, tattooing extended through most of Polynesia from Hawaii to New Zealand.

Lydekker (1906, Vol. II, p. 711) says: "Tattooing—a word of Polynesian origin—that is to say, permanent marking of the skin, in contradistinction to superficial painting—was formerly practised to a very large extent among the natives of North America. . . . The practice of tattooing is carried, however, to the highest pitch among the Haida Indians of the Queen Charlotte Islands, British Columbia, and the Prince of Wales Archipelago, Alaska."

On the Northwest Coast, tattooing among some tribes covered the entire body, with face and limbs. Even women were tattooed among certain tribes in both areas, and the Polynesians and Northwest Indians alike tattooed their youth according to well defined patterns which represented inherited crests, applied in symmetrical and conventional style.

The patterns varied completely from tribe to tribe, and among certain tribes in both areas could even consist of naturalistic animal designs.

An additional and very significant correspondence between the Northwest Indian and the Maori is pointed out by Niblack (1888), who noted that the young warriors in both areas were tattooed with special designs that were "intended to identify them with their sub-tribe or house-hold". In this way the tattooing pattern on the nude warriors would have the effect of a uniform, making it possible to distinguish friend from foe even among the beheaded victims in the field after a battle between these headhunters.

Finger severance

A fairly widespread mutilation of a somewhat different category, not performed for embellishment or identification, was the custom of cutting off a finger as a sign of mourning. Rivet (1926, p. 144) shows how this custom is found almost right across the Pacific, from America as far west as Australia. Jenness (1932) admits that this is one of "several customs that are common to the South Sea islands and America", but rejects a possible diffusion with the following arguments:

"We can hardly believe that the isolated Beaver Indians, for example, who had little or no contact with tribes south or west of the Peace river, severed a finger in imitation of immigrants who landed less than a thousand years before somewhere on the coast of California or farther south, and then lost their identity amid a host of alien tribes. It is far more probable that the custom arose independently in America, where it has a very wide distribution, or else that the ancestors of our Indian tribes brought it from the Old World ages before the Polynesians began their wanderings over the Pacific Ocean."

It must be admitted, however, that the presence of finger severance among tribes east of the Peace river is no valid argument against a possible spreading of the same custom by the Northwest Indians—who also maintained this sign of mourning (Rivet 1926, p. 144)—to Polynesia (and Fiji) where the custom was observed by Cook. The fact that there are missing finger joints on hands painted by Aurignacian and Magdalenian man in Western Europe and by the primitive aboriginals of Australia—and the custom existing among certain women in India of removing a finger joint at the happy birth of each new grandchild—seem to have far less connection with the origin of the Polynesian mourning system than has the identical and contemporary significance of finger severance among the seafaring aborigines of the Northwest Coast.

Social system

When we turn now to the social organization, we find further general and specific correspondences without meeting any evident disagreements. It is well known that throughout Polynesia the tribal system was maintained to a great perfection. The state was composed of tribes divided into families, and each tribe was ruled by a paramount chief below whom were minor chieftains and family heads.

The same social system prevailed among the Northwest Indians, where it was first described by Captain Dixon (1789, p. 227), when he wrote from the Northwest Coast

Archipelago: "Though every tribe we met with at these islands is governed by its respective Chief, yet they are divided into families, each of which appears to have regulations and a kind of subordinate government of its own."

It was mentioned earlier that the clan system existed in Polynesia and that the patriarchal was found as opposed to the matriarchal system prevalent among Melanesian and Indonesian peoples. On the Northwest Coast the patriarchal and matriarchal systems were each represented in distinct sections. We have noticed that among the local tribes, Polynesian analogies seem to focus to a marked degree around the Kwakiutl, and it is of this people Goddard (1924) writes: "The Kwakiutl of Vancouver Island and the neighboring mainland reckon descent usually in the father's sept, and marry into some other."

Social stratification

The same writer (*Ibid.*) points to the important social stratification among the inhabitants along the American Northwest Coast. The seaboard aborigines of the whole of British Columbia and Southern Alaska differ from all other Indians north of Mexico in the social habit of dividing the population into three separate social classes,—aristocracy, commoners, and slaves. In this respect also the social organization of the Northwest Indians is followed closely by the Maori, the Society Islanders, and a number of other Polynesian tribes, who strictly adhered to the same division into a class system with a ruling aristocracy, plain commoners, and feudal slaves.

Land and property

As to the ownership of land, the state was completely communistic among both the Northwest Indians and the Maori-Polynesian tribes. Among the Kwakiutl of Vancouver Island, as among the Maori of New Zealand, the land belonged to the tribe, and every free man was part owner of the ground and its products. If a man wanted something outside the territory of his own tribe, he would have to fight for it, whereas the same individuals, within their own tribe, were rather loosely attached to their few personal belongings. The Polynesians, as is well known, were fond of displaying their generosity by distributing gifts, and among the Northwest Indians this inclination had gone so far that men were held in specially high regard when, having accumulated material wealth, they impoverished themselves by giving it all away.

Niblack (1888) was well justified when he compared the Maori to the Northwest Indians and said: "Their political organization of the tribe, their ownership of land, and their laws of blood revenge are similar."

In Northwest Indian and Maori-Polynesian communities all matters of importance were decided upon at a meeting to which all the warriors of the tribe were admitted, and Allen (1884, p. 263) quotes Pickering to the effect that "the Maori *runanga*, or council for debate, is the American pow-wow".

Public orators

The principal man at these meetings was the public orator, or speaking chief, whose place in the community ranked next to the executive chief and the medicine-man. In both these ethnographic areas he was commonly distinguished by a wooden staff or some other ceremonial symbol when appearing before the public.

Buck (1926a, p. 185) writes from New Zealand: "To a race given to public speaking on every possible occasion, it was natural that the gift of oratory was higly developed. Oratory, apart from modulation of the voice and appropriate gesture, was based on a wide knowledge of traditional history, mythology, genealogy, and an extensive repertoire of proverbs, incantations, and classical songs."

Scheurmann (1927, p. 26) says from Samoa: "The Samoans are eloquent, they also enjoy hearing their own speeches, and their skill of expression is extraordinarily high for an aboriginal people. A real *Tulafale* (orator) literally revels in parables and allegoric comparisons during his speech."

Jenness (1932) quotes an early Jesuit who said that there is no place in the world where rhetoric is more powerful than in Canada. He shows that this included the territory of the Northwest Indians, among whom eloquence was held in equally high esteem, and that here too "their public orators who functioned on ceremonial occasions were men of rank in the communities".

Medicine-men and fire-walking

Besides the executive chiefs and the public orators the medicine-men were of the greatest importance among both peoples. The functions and qualities of the medicine-man were precisely the same in both areas. Their extraordinary powers were attributed by the people to the aid of supernatural beings who at particular times possessed the medicine-man, and spoke through him while he was in some sort of a trance. These medicine-men not only served the community by treating the sick, but some of them were supposed to be able to foretell events and to see what was happening in distant parts. Every local war party in these two areas included a medicine-man, who by his supernatural knowledge warned his side of danger and pointed out favourable times and places for attack.

"He displays his power in various occasions, particularly by walking through fire", says Goddard (1924) of the medicine-man among the Northwest Indians, a performance which is one of their most extraordinary achievements. This ancient practice, and the much debated skill or knowledge that made fire-walking possible, are thought to have entered the Northwest Coast Archipelago by way of ancient Japan.

The fire-walking ceremonies had also reached Polynesia, where the same extraordinary exploits were performed by certain local medicine-men until late historic times, especially in Raiatea and Rarotonga. Fire-walking ceremonies were witnessed by European settlers and missionaries in the Marquesas until these were prohibited by the French Government a few years ago. That the custom was more widely spread among Polynesian medicine-men in early times may be judged from the fact that it existed in a rudimentary form in Hawaii (Henry 1928, p. 219), and, when certain Maoris were told of the fire-walking in Rarotonga, "some old chiefs of the Urewera tribe expressed no surprise and said that their ancestors could also perform the ceremony, though it had long been out of practice". (*Ibid.*, p. 217.)

St. Johnston (1921, p. 172) writes about fire-walking that "it has been found in several places in the Pacific, but only in the Polynesian part of it, and has been much written upon.

It is true that it has been found in Fiji, but only in the distinctly 'Polynesian' island of Benga..." (See also Fulton 1903.)

Religious societies

There existed in the eastern part of Polynesia, at the time of European discovery, a certain religious society which acted somewhat like a group of medicine-men and held peculiar ceremonies. Its members were considered to be descendants of the gods. In the Society Group, from where it is best known, the members bore the name of *arioi,* and nobody could become a member of this exclusive society without a very hard probation period, lasting for months or even years. (Henry 1928, p. 230; Williamson 1939, p. 118.) The *arioi* were received everywhere with great veneration, were splendidly treated, and travelled between the islands in canoes elaborately decorated with flowergarlands. This secret society performed the most bestial and cruel ceremonies; it was guilty of infanticide and cannibalism and its principal object at the time of European discovery seemed to be unrestrained orgies. There are references to similar secret organizations also in the Tuamotu Islands and the Marquesas Group (Williamson 1939, p. 135), and possibly as far west as the Carolines, but no further (Ellis 1829, Vol. I, p. 230). Ellis (*Ibid.*) wrote:

"I never met with an account of any institution analogous to this, among the barbarous nations in any parts of the world, I have reason to believe it was not confined to the Society group, and neighbouring islands. ... How long this association has existed in the South Sea Islands, we have no means of ascertaining with correctness. According to the traditions of the people, its antiquity is equal to that of the system of pollution and error with which it was so intimately allied; and, by the same authority, we are informed that there have been Areois almost as long as there have been men."

Let us again turn our attention to the Indians in the archipelago of the Northwest American coast.

Dreyer (1898, p. 134) renders the following account by Jacobsen: "Some of the most peculiar ceremonies were celebrated by the members of a secret society, the Hametses, who are considered to be half sacred and act like medicine-men. To become a member, one must belong to the best regarded families, and, go through a period of learning and probation which lasts four years. ... One day, when the probation time is over, the candidate all of a sudden runs out of the forest and attacks someone who is previously appointed and remunerated for it, bites a hole in his arm or leg, and endeavours to swallow a mouthful of blood. Still, however, he is not fully a hamets, as he must first take part in one of the horrid meals of the society. It sounds incredible, but it is still a known fact that on these occasions they eat human flesh, and indeed not from fresh corpses, but from corpses which are old and dry. ... These hametses are treated with great veneration, they are thus invited to all celebrations, and set out to them in full decorations with all their tokens of honour, and in a slow and solemn march."

Cannibalism

Cannibalism had also spread into certain sections of Polynesia, including New Zealand. In the most isolated valleys of the Marquesas Group, like Ouia, it was occasionally practised until quite recent generations, and until a few years ago old natives remembered how their own ancestors on certain occasions consumed human flesh in the same decayed condition referred to by Jacobsen on the Northwest Coast. (Heyerdahl 1938.)

It is remarkable to find cannibalism among peoples so highly developed as the Northwest Indians and the Maori-Polynesian tribes. Cook (1784, Vol. II, p. 272) was surprised to find in the Northwest Coast Archipelago "that the horrid practice of feeding on their enemies is as prevalent here, as we had found it to be at New Zealand and other South Sea Islands". However, among both peoples cannibalism was a purely religious rite. According to Jacobsen, the Northwest Indians claimed that it was a god who first instituted the custom. Dreyer (1898), citing just this information in his chapter on the Northwest Indians, adds in a chapter on Polynesia that here too the *gods* were referred to directly by the title of honour "The Man-Eaters". Henry (1928, p. 350) shows that in Polynesia the god Tane is said to be the one who first instituted cannibalism among the islanders forefathers. (See further p. 148.)

The system of tapu

There are still two features of social organization to be taken into account, the law and the economic system.

In both Northwest America and Polynesia the written law was replaced by the wide spread and most effective religious system of *tapu* (taboo). In both areas, a certain act, place, object, or even person, could be declared tapu, very often even the omission to do a certain thing. Some tapus were not permanent, but merely temporary measures and others, again, did not concern everybody. Thus, for instance, in both areas a certain food could be tapu for women only. Many favourable tapus were connected with marriages, the protection of ancestral art and mortuaries, etc., but others, again, were completely nonsensical. To break a tapu was a serious offence against the gods, and fear of punishment by the ever-present supernaturals, rather than fear of being detected by other men, rendered the system of tapu more effective than the majority of modern laws. The author has witnessed cases, in both areas, where wilful as well as unintentional breaking of a tapu nearly ended in the predicted disaster, merely through acute nervousness and auto-suggestion by the ordinarily calm and courageous natives involved.

The measurer of wealth

When we turn to the economic system, we find that true currency in any form was as unknown in the Northwest Indian communities as it was in Polynesia. We have already shown that the shell and stone money of early prehistoric Indonesia were shared with all Melanesian and Micronesian tribes, but were absent from Polynesia. We may now add that the wide-spread North American *wampum*, or shell-beads, used alike for personal adornment and as a medium of exchange, never reached the Indians on the Northwest Coast. (Lydekker 1906, Vol. II, p. 714.)

As a substitute for currency, the bark-blankets described above acted as a sort of circulating medium among the Northwest Indians. Thus Dreyer (1898, pp. 128, 132) says that the carpenters on the Northwest Coast were rewarded with blankets, and goes on:

"The aforesaid blankets, which at present are partly replaced by ordinary European blankets, were, and still are, of great importance. They represent the standard of wealth, a kind of money. The wealth of a man, and the price of an article, is calculated to a certain number of blankets."

We have already mentioned how blankets in the same way were regarded as a measure of wealth in certain Polynesian islands. Scheurmann (1927, pp. 12-18) shows that the Samoan carpenters also were rewarded with a certain number of bark-blankets and mats, and says: "These mats...are the Samoan symbol of wealth. The one who has many fine mats is rich, the one who has few is poor."

Reischek (1924) shows that in New Zealand the local cloaks and blankets held just the same importance as a substitute for a true circulating medium among the Maori.

In his work on Pacific Island monetary systems Petri (1936, p. 550) emphasises the absence of true currency in Polynesia, and adds: "Many authors designate plated mats as a sort of money typical for the Polynesians. According to *Meinicke*, the mats made from pandanus form the principal item of wealth in Uvea, and 'take almost the place of money'. ...*Finsch* is of the opinion that mats in all essentials replaced currency in many parts of Polynesia, and belonged to the most precious possessions of the ruling families."

Nose-rubbing

Let us mention finally that the ancient Northwest Indian form of salution, where two persons "touched noses" on meeting (Swanton 1905), was, as is well known, the universal form of salutation throughout the whole of Polynesia too, including New Zealand.

Burial customs

As is common among many aboriginal peoples which believe in a life after death, the Northwest Indians and Polynesians equipped their deceased relatives with their personal belongings, so that the spirit of the property might follow the spirit of the owner on his journey in the track of the sun.

However, in many Polynesian groups the custom of burial in earthen graves was abhorred by the natives, and when it was forced upon them by our own race, many Polynesians tried at least to substitute burial in dry sand for burial in humus. This attitude they shared with the aborigines of Northwest America, of whom Goddard (1924) writes: "The Kwakiutl viewed burial in the earth with considerable horror when contact with the Europeans first brought the custom to their notice..."

Drucker (1943, p. 33) states: "The Northwest Coast as an area is one in which there was great diversity in mortuary customs." The same is particularly true also of Polynesia. The principal burial custom along the Northwest Coast, as well as in Polynesia, was to deposit the dead in caves or in trees. Jacobsen (1891, p. 162) observed how the Maori and Northwest Indians alike frequently deposited the bodies on wooden platforms raised high above the ground on poles. The bodies were generally either sun-dried in a mummy-like fashion, or otherwise kept until easily reduced to a skeleton. Wrapped in their own bark-blankets and sitting with knees below chin, the Kwakiutl and Maori remains were deposited in the caves or trees. Among some tribes, like the northern Kwakiutl (Drucker 1943, p. 33) and the Hawaiians (Byron 1826, p. 200), gravehouses were built where bodies gradually accumulated. In both areas deceased babies were sometimes wrapped in their blankets and placed in their own dugout cradles, which were exactly the same among both peoples. Cradle-burials of the same type have been observed by the author in both localities. (Kwakiutl at Kwatna Bay; Polynesian at Hanavave, Fatuhiva.)

Burial in canoes, or in parts of canoes, was not uncommon on the Northwest Coast. A Kwakiutl canoe, cut in half and containing three dried Indian corpses well wrapped in bark-blankets, was found by the author in 1940 under an overhanging cliff in Kwatna Bay on the central Northwest Coast. This custom reappears in parts of Polynesia, including New Zealand. Bennett (1931, p. 27) states from the Hawaiian Group that the manner of cave burials varied in Kauai: "Canoes cut in half were used. ... The burial, flexed and wrapped in tapa, was placed in the canoe and cords were wound tightly around the outside."

Williamson (1939, p. 365), observing that burial in canoes or canoe-shaped coffins has a very limited and yet quite sporadic occurrence in both the Old World and the New, says that its existence in Assam, the Marquesas, and North America may just as well be due to independent evolution as to some primordial process of diffusion. He adds: "... for example the practice may have diffused from the Northwest Coast of America to Polynesia, while its occurrence in Assam may be due to an independent development."

As we have seen, early voyagers also compared the carved mortuary posts and burial grounds of Northwest America with Polynesia. When inspecting some of the large Haida plank-houses, Marchand (1801), wrote: "At some distance from these palaces were perceived several mausolea or tombs which bear much resemblance to the Morais of the islands in the Great Ocean."

Not only were personal belongings buried, but slaves, both on the Northwest Coast and in New Zealand, were killed that they might accompany and attend on their masters; and a Maori "wooden club of rare type", which is reproduced in the British Museum Handbook (1910), is in shape and appearance a true reproduction of the conventional "slave-killer" among the Northwest Indians.

We have now pretty well covered the main aspects of material culture and social life of these two adjoining maritime societies, and we have found evidence which, without offering fresh complications, offers a satisfactory explanation of the many difficult problems which arise if Polynesian immigrations is supposed to have been effected directly from Asia or by way of Indonesia. In addition, we have come across a vast array of more or less identical practices and close resemblances between the two East Pacific cultures and culture-bearers here involved.

Religion, mythology and verbal preservation of tribal history

The Polynesians, as stated earlier, were ancestor-worshippers, and believed their own sacred ancestors to have descended in straight line from the primeval elementary gods of the earliest times. A number of the principal Polynesian ancestor gods were identified with, or descended from, the sun, the sun-rays, the sunrise, the dawn, the bright light, the golden light, or other solar deities. Owing to their ancestor worship and their reverence for the persons and customs of the past, we find a pronounced historical-mindedness among all Maori-Polynesian tribes; past events and relationships are verbally memorised for the purpose of establishing descent from the deified aristocracy of the tribal past. Thus, as stressed by Buck (1926a), few aboriginal peoples offer as dependable traditional information as do the Maori and his kin, at least concerning the tribal events of the last few hundred years.

Jacobsen (1891, p. 161) observed in general that there were apparent resemblances between the religious concepts of the Northwest Indians and the Polynesians, and Drucker (1940, p. 227), in his special survey of Kwakiutl Dancing Societies, writes of these tribes: "An outstanding characteristic of the civilization of the northerly portion of the Northwest Coast is the historical-mindedness, fostered, perhaps, by the claiming of hereditary right to privileges in establishing one's social position. So matter of fact and so consistent are these relations, particularly those referring to the upper time levels, that they deserve careful consideration."

Later, during his archaeologic survey of local village sites, the same author (1943, p. 33) writes: "Along with the system of graduated status in part based on ancestry was a marked interest in historical tradition. Genealogies were systematically remembered, to be recited on formal occasions. These family legends, which purport to cover the family's history from the time of its earliest ancestors, are far more than a recital of personal names and relationships—they tell also of war and conquest, and of movements of families from one place to another. The places referred to are actually long-abandoned village sites. So matter-of-fact and internally consistent are these relations, and above all, so consistent are those of one family line with the traditions of their neighbours, that no ethnographer who has worked in the area has denied their historic value."

Barbeau (1945, p. 425), too, stresses how the Northwest Indians possessed a verbally memorized tribal history, with "true stories" or *adaorh*, "that the elders were in the habit of relating on ceremonial occasions". This is a well known characteristic also of Maori-Polynesian community life.

Appearance of the North American "Wanderer" on the Northwest Coast

In his paper on the evolution of the mythologies of the North Pacific coast of America, Boas (1895 b) shows that the traditions of the Kwakiutl, Salish, and neighbouring tribes are full of references to some culture-bringing wanderers, strictly human, and yet with divine powers, who in one sense were regarded as creators and founders of the local families of chiefs, yet in reality were always admitted to be no more than foreign benefactors, travelling by land until they settled down locally to marry the daughter of some early chief. Boas (*Ibid.*, p. 507) stresses that these same traditions of beneficent and culture-sponsoring wanderers are widespread in early American traditions, appearing in "endless repetitions with countless variants". On the Northwest Coast he shows that animal myths and raven-stories predominate to the far north, but that the traditions of the wanderers have entered all the tribes to the south. He says (*Ibid.*, p. 498):

"Another important series of legends in the territories in question includes the traditions of the wanderer, which are also most strongly developed in the south and terminate with the Newettee [Kwakiutl tribe on north point of Vancouver Island], to give way to the legends of the raven. It is not possible to find a sharply defined home for this tradition, as it is too generally distributed over the whole continent and presents an endless number of variants."

The source of these consistent references to the alien wanderer may for the present be left a matter of speculation. We may, however, find in these traditions sufficient reason to suspect that such continental diffusion, carried out by exploring individuals from some of the highly active American culture centres to the south, may explain the many secondary elements in the Northwest Indians' physique which distinguish them from the norm of Yellow-brown peoples. Certain is it, that there is a marked distinction between the semi-historical legends of the venerated foreign wanderer, such as are preserved in the traditions of the Kwakiutl, and the purely fairy-tale nature of the animal stories among some of the other tribes.

Boas (*Ibid.*, pp. 499, 506) says: "The remarkably rich development of the tradition among the Kwakiutl, recognized through the wanderer's meeting with the ancestors of the respective families, might find its origin in the Kwakiutl family-system. The family crests and rights were nearly always established through the belief that these had been granted by the wanderer, who had either compared strength with the ancestors, or else had married their daughter." Also: "Among the Kwakiutl we find the animal legends to be replaced by the series of mink- and wanderer-legends. Moreover, the animal legends do here step even more into the background than among the Tsimshian. In their place the legends are entirely dominated by ancestral traditions, which deal with the lineage of the respective families."

Kane as human instructor and representative of the sun

Since Boas showed how the locally wide-spread wanderer tradition seemed to terminate with the Newettee or Nawitti people on the northern tip of Vancouver Island, we may turn to them for further information concerning this deified ancestral hero. Dawson (1888, p. 81) tells us: "The traditions and stories of the Kwakiool people appear to centre chiefly about Cape Scott, the northwest extremity of Vancouver Island. . . . It is the point identified with the appearance of their culture-hero and may be assumed to be the site of their earliest home, in so far as this can be ascertained through the distorted medium of tradition. . . . The name of this hero, like other words in the language, is somewhat changed in the various dialects. After hearing it pronounced by a number of individuals in the northern part of Vancouver Island and on the west coast, I adopted 'Kan-ē-a-ke-luh' as the most correct rendering. The 'Nawitti' people use a form more nearly rendered by 'Kan-e-a-kwe-a'."

Dawson describes how this Kwakiutl culture hero originally reached the local Northwest Indians not from across the ocean, but by travelling by land and on foot, performing wonderful and supernatural things as he walked through the country. Kan-e-a-kwe-a or Kan-e-a-ke-luh did not settle permanently among the local people. His brother however, remained for ever on Vancouver Island, and from him several of the tribes claim their descent. But about the chief deity himself we learn: "At last Kan-ē-a-ke-luh left Cape Scott finally, going very far away and disappearing altogether from mortal ken, so that the people supposed the sun to represent him." And another place: "These are some of the chief acts which Kan-ē-a-ke-luh performed. After finishing all his works, he married 'a woman of the sea' and went away over the ocean and was no more seen."

Dawson also quotes the Rev. Mr. Hall, who mentions the same Kwakiutl culture hero with a slightly different suffix to the root of his name: "No one knows his origin or whence he came. He never travelled in a canoe, but always walked. He is regarded as a deity and as the creator. Those who blasphemed him, he turned into birds, beasts and fishes; but those who spoke well of him, he turned into men and protected. The heron was once a man who despised Kānī-kē-lāq. It was Kānī-kē-lāq who stole fire and water and gave them to the Indians."

Qāneqelak or Kane-ke-lak, is also shown by Boas (1935, pt. 1, p. 1), in his monograph on *Kwakiutl Tales*, to be the main god and earliest divine ancestor of Kwakiutl people. According to Boas' informants, that great ancestor built a big house for his brother on the Northwest Coast and gave him some of the local tribes as subjects, whereupon he himself departed, saying that he wanted to go to more southerly latitudes. (*Ibid.*, p. 5.)

Dawson (*loc. cit.*) continues: "The close connection of the culture-hero, Kan-ē-a-ke-luh, with the sun, has already appeared in the tales concerning him, together with the belief that the chiefs, or some of them, are related to Kan-ē-a-ke-luh by descent through his younger brother. Doubtless, also, in connection with this, we find that the sun, na-la, under the name Ki-a-kun-ā-e, or 'our chief', was formerly worshipped and prayed to for good health and other blessings."

From the local references to this solar culture hero we may assume that his original name was *Kanē-*, *Kane*, or *Kani*, with the respective epithets of *a-ke-luh*, *a-kwe-a*, and *ke-laq* or *kelak*.

We do not have to go further from Cape Scott and Vancouver Island than Hawaii to find that here, too, *Kane* has been the great man-god and leading culture hero among the early local settlers. Fornander (1878, Vol. 1, p. 60) says: "This 'Kane' creed, such as it has been preserved in Hawaiian traditions, obscured by time and defaced by interpolations, is still a most valuable relic of the mental status, religious motions, and historical recollections of the earlier Polynesians. No other group in Polynesia has preserved it so fully, so far as my inquiries have been able to ascertain; yet I have met with parts of it on nearly all the groups, though more or less distorted, and in that case I hold that the universality of a legend among so widely scattered trives proves its antiquity."

What is more, the Hawaiian Kane, like his Kwakiutl namesake, was precisely the human personification of the sun. We find that: "In Hawaii... the sun is called 'the restingplace of Kane'..." (Mc Cosh Clark 1896) precisely as we learnt from the Vancouver Island Kwakiutl that these natives considered the sun to represent their Kane after his departure with the woman of the sea. Let us add that the actual sun itself, known to the Kwakiutl as *na-la*, is known to the wide-spread Polynesians as *la*.[1]

Best (1924 b, p. 57), in his monograph on *Maori Religion and Mythology*, identifies the Hawaiian ancestor-god Kane with the important Maori ancestor-god Tane (Hawaiian K = Maori T). After stating that Fornander has clearly shown that the Hawaiians knew Kane as representing the sun, he claims with regard to the Maori: "There is abundance of evidence that Tane represents light, and that his name of Tane-te-waiora represents him as the source of the sunlight, which is the welfare of all things." (See also Part X.)

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[1] *Lah* is the word for "sun" also in the Kulanapo (Pomo) language of northwestern California.

As the Kwakiutl personified sun—Kanē—was the hero who first gave fire to the Indians, so was his Maori counterpart, Tane, the hero who first gave the Maori ancestors light. Best (*Ibid.*, p. 54-59) cites long Maori legends to this effect, which end with phrases like: "Tane had illuminated the world," or: "This was how Tane brought light to the world." Best (*Ibid.*, p. 59) also quotes Gill to the effect that "at Mangaia Tane seems to have been recognized as the sun".

The basic origin of the name of this primeval culture-hero may be the closely related word for 'man' among all the Déné-languages of wide areas of Northwest America, as well as in the Polynesian dialects.

We may note in passing that the most striking difference in the (solar) ancestor-god Kane or Tane, as he is remembered in these two ethnographic areas, is that whereas the Vancouver Island Nawitti reckon descent from the sun-god's brother, who remained when Kan-e-a-kwe-a himself disappeared with his wife over the ocean, the Hawaiians and other Polynesians reckon descent from Kane himself. What may be the cause of this peculiar difference in traditional beliefs it is difficult to say. But in view of the particular historical-mindedness of both these peoples, who carefully preserved all important events of the tribal past, and of the marked predilection for allegories and symbolism among the local orators and historians, we shall not overlook the possibility that the stirring and active personality, Kane, as described to us through the medium of the historical tradition of an intelligent but superstitious people, may have an early kernel in some important local event. At least, I do not find it improbable that active disciples of such fanatical sun-worshippers as flourished in more southern parts of North America may have been responsible for the many myths and traditions of sun-worshipping wanderers in this continent, whose main object seems to have been to travel about and impress upon less culturally advanced aborigines their own religious doctrines based on a human hierarchical relationship to the sun.[1] I do not unduly stress this point, but hold it as a personal opinion which has no direct bearing on the fact that the historical traditions in question, as such, are shared by the Northwest Indians and Polynesians, with the closest analogies in the geographical steppingstones of Cape Scott on Vancouver Island and Hawaii.

We have seen how the Pomo-Kwakiutl-Polynesian name for the sun as such was *lah*, na-*la*, and *la*, and we shall in Part X see how the root *Kan* as name for the sun-god reappears among the foremost sun-worshippers of the early American high cultures. At present this is outside the scope of our study, and we shall instead concentrate on the various epithets with the root Kan-ē, Kani, and Kane among the Kwakiutl people. Although this same human god or sun-priest, like the other local "wanderers", invariably travelled by foot and on land, he may still be of special interest in the present connection, as he is the only one of them suddenly to depart for ever across the open Pacific after he had married, on the northern tip of Vancouver Island, "a woman of the sea".

As Dixon showed, the Nawitti tribes nearest to Kane's traditional point of embarkation at Cape Scott referred to this solar deity or culture hero with a dialectic suffix most correctly rendered as *a-kwe-a*, his full local name being *Kan-e-a-kwe-a*, or also *Kane-akwea*. We recognize in *akwea* the symbolic *Polynesian* name for Kane's mythical "father", which was *Akea*, or in some dialects Wakea and Atea, a word which in Polynesia simply means "light". One of Kane's full names in Hawaii was *Kane Uakea*. (Malo 1898, p. 180.) In the Marquesas Islands some people claim their descent from Atea and Tani, here considered to be brothers. (Fornander 1878, Vol. I, p. 40.)

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[1] Reasons for believing that Middle American high-cultures have had influence upon the material culture of the Northwest Coast have frequently been propounded. (See for instance Mac Leod 1929; Olson 1929; Ruggles Gates 1934, pp. 26, 27; etc.)

The other Kwakiutl name for this local hero, *Kani-ke-laq*, or *Kane-ke-lak*, would in Polynesian pronounciation lose the consonant at the end of any syllable, and become *Kani-ke-la*, or *Kane-ke-la*, which in the Polynesian tongue simply means *Kani-* or *Kane-the-sun*. This interpretation is the more likely when we know the close relationship between the word for sun, *la* and *na la*, in the two languages in question.

The mythical parents of Kane

Dawson (1888, p. 82) supplies another important piece of genealogical information that may help us to a further identification of this important Kwakiutl-Polynesian progenitor. He states from the Northwest Coast that "the father of the hero was named Ma-kwans, the mother Haia-tlela-kuh".

Remembering again how the Polynesians either add an extra vowel or else omit the consonant at the end of a word, the name of Kane's mythical father on the Northwest Coast, *Ma-kwans*, or *Makwans*, would in Polynesian dialects become *Makwa*. This is precisely how the Polynesians pronounce their own important word *Makua*, which throughout Polynesia is the collective name for the early ancestral gods and divine spirits. The word appears in the various Polynesian dialects as Makua, Matua, Akua, and Atua. In Williams' Dictionary of the Maori Language we find Matua to mean both "god" and "the first", and furthermore, in direct correspondence with the name of Kane's father in Kwakiutl mythology, we read: "Matua; *Parent*, and more especially the father."

The name of the mythical mother of the Kwakiutl culture hero, *Haia-tlela-kuh*, or *Hai-a-tle-la-kuh*, would in Polynesian pronunciation become *Hai-a-te-la-ku*. The particular suffix *ku*, with a meaning corresponding to "divine", is in Polynesia very commonly attached before or after such ancestral names as are very sacrosanct in their mythology; *la* is again the sun; *te* is the definite article; and *a* is the possessive pronoun. The full name is thus directly translatable, in accordance with known Polynesian terms and grammatical rules, as Hai-of-the-divine-sun. This is interesting, because to the Maori the sun represents "the higher kinds of knowledge" (see Part X), whereas the same Maori refer to their supreme god of wisdom as *Hei*. (McCosh Clark 1896.) The Kwakiutl Hai-a-tle-la-kuh, in the sense Hai-of-the-divine-sun, accordingly has a name and suffix which completely cover the name and nature of Hei, the Maori god of wisdom.

The fact referred to by Dawson that the Kwakiutl reverenced the sun under the name "our chief" may be seen in connection with the Maori saying "proceed, above is our ancestor, the sun", and, also with the Maori custom at the death of a great chief to send through the land the message: "The sun has set." (Best 1922, p. 13.)

The sun-snaring myth

We may finally repeat how the Kwakiutl culture hero is associated with the clever person who by trickery stole fire from its guardian "at the edge of the day", a myth related to the wide-spread series of American heroes who obtained fire for humanity by snaring the rising sun. Both Henry (1928, p. 466) and Luomala (1940, p. 49) observe how the Polynesian islanders, just like the North American Indians, record the sun-binding legend, in which the culture hero snares the sun with an all-powerful rope made from his sister's hair.

Luomala (*Ibid.*) presents an interesting study of "Oceanic, American Indian, and African Myths of Snaring the Sun", and says: "The most impressive similarity between any two areas is the Polynesian and North American use of rope made from a woman's pubic hair. The element of the hair rope is most elaborately developed in variants from the nucleus of each area."

The sun-snaring myths have a marked eastern distribution in Oceania, and nothing similar is recorded from Indonesia. A myth simply describing the snaring of the sun by means of a rope may be invented independently in Africa and America, but, when the North American Indian and Polynesian versions agree on such a specialized and singular detail as the statement that the rope for snaring the sun was made of a woman's pubic hair, then we may wonder, in view of the various data enumerated above, if a transfer through parental diffusion is not the most plausible of all explanations. To avoid what possibly seemed to her a hasty conclusion of American-Polynesian contact or diffusion, Luomala points to "the strong beliefs in the magical properties of human hair both in Polynesia and in North America". However, by thus adding only one more analogy to the already existing chain, we do not lessen its value.

The raven as ancestor

It has been mentioned already how both Northwest Indian and Polynesian tribes believe in the existence of a spiritual part of the body, which, after death travels to the west in the track of the setting sun: also that the raven was a sacred bird both in Northwest America and in Hawaii. In Northwest America the raven was actually considered a sacred ancestor, and in Hawaii sacred ravens, under the name Atuas or ancestral spirits, were described by Capt. King during Cook's visit. (Cook 1784, Vol. 3, p. 160.)

Traditional memories of the Pacific North

A certain number of Polynesian myths, or rather traditions, in themselves indicate a Polynesian arrival from high northern latitudes, outside the tropic belt of the Pacific.

Brown (1927, pp. 113, 153) writes: "Most of these Polynesian gods and demigods of the underworld have indications in their careers of having come from a land of bitter winter." Further: "And there is still a tradition among the learned men of Rarotonga and Atiu that their ancestors came from a land whose trees were half the year without leaves and where the people walked on the water."

Correspondingly, Percy Smith (1910 a, p. 177) states: "The Tongans have also tradition of the ice-covered ocean, which they call Tai-fatu, which means the thick fatlike or congealed ocean, and to which some of their ancestors had been in ages long ago."

The same writer (*Ibid.*, p. 176) was asked by an old Maori if he had ever seen the part of the ocean where the *maraki-hau* dwelt. He writes: "Now, the Maraki-hau is a well-known figure depicted an ancient Maori carvings, and the origin of which has much exercised our ethnologists; it has the body and face of a man, but the lower half is a fish's body and tail, — in fact, it is just like a merman. But it has in addition, two long tusks coming out of its mouth which the Maoris call ngongo, (or tubes), these are as long as from the mouth to the waist of the figure. To my mind it is the Maori representation of the walrus, or sea-elephant, which they could see only in high latitudes. The old man who questioned me on the subject, clearly had in his mind that the Maraki-hau dwelt in that mysterious part from whence their ancestors came to New Zealand."

Brown (1927, p. 170) speaks of the same mythical creature, and remarks: "It occurs in New Zealand and Micronesian art, carved on the handles of utensils, on gourd bottles, and woven in stuffs, and it reappears in almost identical form in Alaskan patterns."

As is well known, the only marine mammal with tusks is the walrus, which in that respect differs from the other pinnipedia. The walrus does not belong to the South Pacific, but to the *extreme* North Pacific far north of Hawaii, and is an old acquaintance of the Northwest Indians, seen in quantities in the northern section of their own archipelago.

If the Polynesians had come from Indonesia, why did they depict and memorize the walrus? Why did they not, instead, retain in their art and traditions some recollection of the colossal tusked elephant so important to the people of India, Malaya, Sumatra, and Borneo? As shown by Majumdar (1937, p. 28), the earliest Indonesian stone-carvings in Sumatra abound in figures "either riding on elephants or engaged in fighting with them". Schnitger (1942, pp. 141, 144) shows that 16 elephants are decipted together with the oldest known Indonesian boat reproductions, on a two thousand year old bronze drum from Saleier Island south of Celebes. He also points out how elephant motives, often in conventionalized forms, accompany the earliest ships' figures in various parts of Indonesia, even on smaller islands where no elephants occurred. The absence of the elephant from early American art has been much discussed and adequate importance attached to it, but few, if any, have commented upon the fact that neither the elephant nor the sacred Indonesian buffalo has left a trace in the art or recollection of the recently arrived Polynesians, nor among their oceanic neighbours of Micronesia. Instead, they have brought the tradition of a *maraki-hau*, a marine mammal having a seal's body from head to tail but in addition two "ngongo" coming out of the mouth and extending down to the waist of the figure, a description typical of no creature but the walrus of the archipelago in the extreme North Pacific, high above Hawaii.

The languages

When we now turn to the languages spoken by the historically known tribes along the Northwest Coast of America and within the Polynesian island world, we are confronted with one serious obstacle to our comparative study. The Northwest Indian speech material is known to have been utterly distorted during recent centuries by linguistic taboos, tribal interchanges, and a carelessness in speech which was noted and commented upon by the first European visitors. In some cases, as shown by Barbeau (1945, p. 425), the traditional history of one single tribe showed that its ancestors were forced to change their languages four or five times, owing to encounters and alliances with other local inhabitants with different tongues.

Captain Cook's companion, Anderson, wrote during their early visit to the natives of Vancouver Island (Cook 1784, p. 335): "They seem to take so great a latitude in their mode of speaking, that I have sometimes observed four or five different terminations of the same word. This is a circumstance very puzzling at first to a stranger, and marks a great imperfection in their language."

The instability of the Vancouver Island languages is so great that Bancroft (1875, Vol. I, p. 175) writes about the Nootka people alone: "These tribes differ but little in physical peculiarities, or manners and customs, but by their numerous dialects they have been classed in nations." He shows that Sproat, led by linguistic study, divides them into nations which he claims to be "almost as distinct as the nations of Europe".

Also Boas (1925, p. 22) emphasized that, in contrast to the Eskimo and Mexican tongues, it is probable that Northwest Indian languages "have been very unstable". He exemplifies his assertion by pointing to the language of the Salish tribes, "which is split up in many strongly differentiated dialects, each confined to a small area."

With this inconstancy of speech, which is thus apparent even within sub-groups of one single branch among the different Northwest Coast tribes, the multitude of divergent local tongues have been of rather limited value in the efforts to trace external movements and relationships. In a later publication, Boas (1929, pp. 112-116) exemplifies this fact by showing how we know, from the positive evidence of physical anthropology and ethnology, that the Northwest Indians are related to neighbouring Northwest American and Northeast Asiatic tribes, yet on account of what he terms "the fundamental structural differences" between the local language and those of these related tribes, it is impossible to trace even known physical relationships with the aid of the surviving local tongues.

This instability of the great variety of different Northwest Indian languages must have had a corresponding effect upon their ancestral relationship to the stable tongue of the completely isolated Polynesians. Little if anything is known of the original language spoken by the Northwest Indians in the early period when they transferred their habitat from Eastern Asia to Northwest America. If the transfer has been more or less a direct sea voyage with the current from Asia, as assumed by Barbeau and a number of other competent authorities, then we must not overlook the possibility that the language spoken then could be as much related to an early East Asiatic linguistic stock as the tongue which is still preserved under isolation in Polynesia. We do not know how much Asiatic speech material was preserved in Northwest America when the Polynesians departed into Oceania, but if the widely accepted assumption that the Northwest Coast tribes came with one of the last migrations to America is correct, then there should be reason to expect them to have retained Asiatic speech material longer than most American tribes.

Local mythology has shown us that we shall have to be alert for Polynesian vestiges also in Northwest Coast language. The fact that legendary Polynesian names such as Kane, Akea, La, Ku, Makua, and Hei, are shared with Kwakiutl mythology only with slight dialetic modifications, would indicate the possibility that other mutual speech material than mere single words may still be existent.

A casual observer will at first sight be struck by the marked phonetic difference between the present languages of the Northwest Indians and the Maori-Polynesians, the former being distinguished by a remarkably 'throaty' quality, with harsh guttural sounds, the latter being unusually soft and melodious. This difference, at least, is modified and decreases as we go back through time. Hill-Tout (1898), Boas (1925, p. 22), and others have shown that the harsh quality of the Northwest Coast languages, with the slurring of vowels, has been a steadily increasing phenomenon, which the former writer tentatively attributes to the damp and misty winter climate of the archipelago. We need go no further back than to the time of Cook's visit, when Anderson (Cook 1784, p. 334) wrote about the same qualities of speech on Vancouver Island: "Their language is, by no means, harsh or disagreeable, farther than proceeds from their using the *k* and *h* with more force, or pronouncing them with less softness than we do; and, upon the whole, it abounds rather with what we may call labial and dental, than with guttural sounds."

Polynesian speech development has, during the same period of time, gone in the very opposite direction. It has gone through a systematic softening process, which has been carried so far that in many dialects certain consonants are not even pronounced, but simply omitted, so that their former existence can only be known through comparison with the dialect of some other Polynesian group where they still exist. (Ex: Marquesas, *'a'o'e* = "no"; Tuamotu, *kakore* = "no".)

Few observers have made any attempt to take up a comparative study of Northwest Indian and Polynesian languages. To the knowledge of the present author only two serious efforts in this direction have been made, both of which directly resulted in the claim that the Northwest Indians had arrived from the Pacific Islands, a conclusion founded solely upon the finding of a proposed linguistic unity.

The first attempt was made by Campbell (1897-98) and published in his essay "The Origin of the Haidahs of the Queen Charlotte Islands." He reached the conclusion that the Haida language as much as the Polynesian should be included in the Oceanic family, and that the language of the Queen Charlotte Islands must have derived from early immigrants from the South Sea Islands.

Shortly afterwards, Hill-Tout (1898) presented his paper "Oceanic Origin of the Kwakiutl-Nootka and Salish Stocks of British Columbia and Fundamental Unity of Same,..." He came to the conclusion that the different languages of these tribes also seemed to be the distorted remains of an early common language that had been directly related to the present Polynesian tongue. From this he deduced on linguistic grounds that the Kwakiutl, Nootka, and Salish speech had originally spread to Northwest America directly from the adjacent linguistic domain of Polynesia. Behind the differentiation and local evolution of these unwritten aboriginal tongues, Hill-Tout found enough comparative material to marshal an impressive list of linguistic correspondences and conformities, upon which he concluded:

"It is impossible to explain these marvellous and far-reaching similarities without admitting an Oceanic origin for these Columbian stocks. The data here offered in support of this fact constitutes but a fraction of what I have gathered in my investigations, extending over years, and my own conviction of the relationship existing between the Kwakiutl-Nootka-Salish and the Polynesian arises as much from the cumulative force of the thousand

and one little correspondences which are scarcely susceptible of illustration in a brief paper like this, as from the more obvious and striking ones given. The morphology of the Salish, I may add, is nowhere radically different from that of the typical Oceanic groups, and at times most remarkable correspondences occur. All the Salish dialects, like those of Polynesia, make use of particles and auxiliary verbs in verbal inflection. Prepositional and conjunctive terms with common use, significance and form abound. The articles and demonstratives show close resemblance, being frequently absolutely identical. The position of the adverb and adjective is the same. . . ."

Among the many unusual grammatical peculiarities, Hill-Tout points out the practice, common to the Northwest Indians and Maori-Polynesians, of associating a person with his tribe by the use of the prefix *Ti* or *Ati*, which they attach to his tribal name to convey the meaning that he is 'member of' or 'descended from' that stock. Hence he adds: "It is impossible to consider the common use of a prefix of this kind without regarding it as a strong link in the chain of evidence of common origin and one wholly beyond the work of chance."

When Hill-Tout was in 1940 made acquainted with the present author's opinion that the Polynesians, as a rootless oceanic stock, may have had their continental origin among the ex-Asiatic Northwest Indians, rather than that the latter continental people had an oceanic origin, he admitted that the transfer might have been in either direction so far as the languages were concerned. In the press discussion that followed, he met the argument that Capt. Cook and other travellers might have obtained utensils in Polynesia and then brought them to Northwest America with the comment: "In view of the strong linguistic connection that theory is ruled out." (Vancouver Daily Province, Apr. 3rd 1940.) In a local editorial (*Ibid.*) there appeared on the same occasion the following comment:

"Mr. E. A. Haggen, . . .himself a native of New Zealand and well acquainted with the South Sea Islands, claimed, more than a quarter of a century ago, to have found sufficient evidence in the languages of the Haida Indians, the natives of Hawaii and the Maoris to indicate that these peoples had had some connection with one another in times far gone."

The seemingly remote back-door location of the Northwest Coast Archipelago has not encouraged much attention among Polynesianists, and has not been in the limelight for all those whose surveys have been focused from Polynesia upon all nations from Indonesia and westwards even to India, Arabia and Egypt. But the possibility of finding the vestiges of a prehistoric link between Malay and Polynesian tongues in the distorted and unstable languages of the Northwest American Archipelago looms large, in view of all other comparative evidence in race, culture, and mythology, and in view of the confidence of success of those who have objectively looked into the matter, encouraged only by chance observations and not dictated by preconceived theories of Polynesian origins.

The essence of the Northwest Coast survey

The aim of the present chapter was to test whether the Northwest American Archipelago would stand up to the requirement of a territory that could have served as a mile-stone in the protracted transfer of Polynesian ancestry from somewhere in early Asia to their recent abode in the East Pacific. We had previously demonstrated that a transfer by way of the

Austro-Melanesian continental block, the Micronesian atolls, and behind all this Indonesia, had not only completely failed to solve our problem, but had merely presented instead an additional series of conspicuous problems of various natures, none of which could be disentangled without other and larger problems taking their place.

From a geographical viewpoint we found that the coastal people of Eastern Asia had as easy and natural access to Northwest America as to Indonesia and Melanesia. Seashore fishing tribes may have spread from one side to the other in a few generations, and coastal drift voyagers may have been transferred from the Philippine Sea, the China Sea, or the Japan Sea in a matter merely of weeks. From Northwest America we shall soon see how the road was open to Hawaii, also in a few weeks travel.

We were looking for a natural and practicable route of discovery for the Polynesian ancestors in the midst of the strongest trade wind belt, and in dugout canoes, some of which at least, like the Maori craft, could hoist a bulrush sail only when travelling with the wind. We also sought an explanation why the Polynesians had reached Micronesia and Melanesia from the east, leaving colonies only on the eastern fringes of the nearest marginal groups.

All this is only natural for voyages from the Northwest American Archipelago, which *begin* in the East Pacific.

We were looking for an area where the Polynesians could get from the western side of the dark-skinned Austro-Melanesian barrier to the eastern without losing their fair skin but acquiring instead a much fairer hue, taller stature, and other rather Caucasian-like aspects. These requirements were satisfied in the Northwest Coast Archipelago, where we directly found a mixed American race of Asiatic origin which shared all its principal physical features with the Maori-Polynesian race. These aborigines had literally the same blood as their Maori-Polynesian neighbours, as opposed to all tribes further westwards through the Pacific.

We needed an area with a maritime culture with seaworthy craft to bridge the ocean gap isolating Polynesia from the rest of the world. We found an archipelagic fishing population possessing an enormous deep sea canoe of the same architectonic design, size, and capacity as the Maori canoe, with a former habit of lashing two canoes together in Maori style, covering the resultant seaworthy craft with a plank deck and hoisting up a matting sail in a fair wind.

We were looking for a stepping-stone on the Pacific coast where the Maori-Polynesians could have remained as a stone age people until recent Christian times. We found it among the same American aborigines, and we even found the place where recent neolithic people had developed materialized expressions for their stone age state which coincide with those of Polynesia. This refers to such purely neolithic elements as the adze type of the carpenter, the bone and stone club of the warrior, the wooden halibut hook of the fisherman, or the polished pestles of the women.

We needed an area where the Maori-Polynesian ancestry could have remained until Christian times without adopting the world-wide manufacture of pottery. We found it among the same American aborigines, and we even found, in the place of pottery in this area, the same earth-oven which was spread by the Polynesians into all their parts of the East Pacific.

We looked for a locality where the Polynesian ancestors could in the same way have remained unacquainted with the loom and the use of wool, cotton, and silk in any form of textile. We found it in the same Northwest American Archipelago, and what is more, we found here, as the substitute for spun wool, cotton, and silk, finger-woven bark fabric with an intimate resemblance to Maori blankets, and a grooved Polynesian-like mallet for bark-beating in the place of the simplest loom.

We were looking for an area where cereal cultivation, the wheel, the alphabet, the arch, cement, alcohol, and a true monetary system were unknown. We found all these features together on the Northwest American Coast, and we found, as a substitute measure of wealth and a circulating medium, the aforesaid bark-blankets rather than artificial money of stone and shells.

We found, in addition, an all-embracing series of strange analogies, correspondences, and even identities with known facts from Polynesian life and material and social culture, together with a concurring memory of mythical names and, finally, independent claims of a linguistic kinship between the aborigines in question.

What is more, we had our manifold problems satisfied without creating any obvious new ones.

We had, also, a sound chronology, and we found the evolution area well rooted on the American side, with a loose spread of homogeneous elements over Maori-Polynesian islands. Although rooted in a large continental area, we yet found the vast bulk of analogies to be centred about one marked nuclear and radiating area involving primarily the Kwakiutl, Nootka, Haida, and Salish people, and with a focusing centre somewhere around the Kwakiutl stocks of the northern part of Vancouver Island.

Kwakiutl Islanders, bred on the very sea-coast of the roaring Pacific, and raised from childhood with a canoe designed and used for fishing in the deep sea, lived as near to Hawaii as Hawaii was to Tahiti and Samoa; and there was no Australian continent to pass through, nor any contrary elements to impede their progress, on a spread into the adjoining Polynesian section of the ocean.

PART III

THE ROAD THROUGH HAWAIKI

THE ROAD THROUGH HAWAIKI

The effect of 'time' and 'direction' upon actual voyaging distance

A general map of the Pacific is a deceptive guide to the ethnologist. This has been stated before, but may well be repeated. Any observer who has reached the mid-Pacific islands in an aboriginal type of craft will fully realize that this marine world literally has four dimensions: length, breadth, depth, and time. Any local body of surface water has only a momentary longitude and latitude, which alter rapidly from one day to the next.

The position of a body of water cannot be plotted on a map; only the stationary islands can be pinned down. A migrant into the vast Pacific does not travel on the stationary islands, but in the midst of mobile water. Thus, when the number of miles is given from one stationary coast to the next, then this measure refers to the map or to the solid ocean bottom only, as the actual surface traveller in the fluid space between the coasts often has an entirely different mileage to cover. When crossing in one direction he may have to plough through vast stretches of surface in excess of the given mileage, but while crossing by the opposite direction, he may traverse only a fraction of the surface distance measured on the map and yet suddenly be at his destination. Only continental migrations may be roughly compared and measured without regard to the time factor. The *travelling* distance between two fixed points in the Pacific water-space is not told by a glance at the map, it can only be fixed when we know the speed of the craft and the course of the voyage, whereby the time element can be taken into due account. The slower the speed of the travelling craft, the more time is permitted to pass, and the greater becomes the incongruity between the theoretical mileage and the distance to be travelled in reality. As an example we may mention that the Kon-Tiki raft, after ploughing through less than three thousand miles of surface water from the coast of Peru, had reached the Tuamotu islands which are more than four thousand miles away. An engine driven craft, going in the contrary direction, against the trade wind but at the same speed as Kon-Tiki's average drift, would have to cover between five and six thousand miles of moving surface water to reach Peru from the same Tuamotu islands. As no sailing craft can maintain as high a speed against the wind as before it, we find that there is for primite craft, in actual *travelling miles*, at least twice as far to sail from Polynesia to Peru as from Peru to Polynesia.

The failure to illustrate the time element embodies the most compelling and yet the least conspicuous misrepresentation of any Pacific island map. Of much less importance is the fact that on our common Pacific maps, which are in Mercator projection, even the direct distances between purely stationary points are misrepresented. Distances in northern latitudes are enlarged in relation to those nearer the equator. It follows that on the average map the Hawaiian islands are removed further from the Northwest Coast Archipelago than we find them to be on a globe with correct curves and consistant relations.

On a globe, as in reality, the mere 'measured distances' around Hawaii are in themselves rather striking. The Hawaiian Group is equally close to the Queen Charlotte Islands, Vancouver Island, Washington State, Southern California, Tahiti, Samoa, and the Gilbert Islands, all about 2 200—2 300 miles, and even closer to the Aleutian Islands and the States of Oregon and California, whereas it is double the distance from China. In 'travelling mileage' however, Hawaii is hundreds of miles nearer to Northwest America than to any other inhabited shore. The moving water to be traversed on a journey from the Kwakiutl domain to Hawaii shortens the distance by about a hundred miles for a modern ocean steamer, and many hundreds more for a prehistoric double canoe. As is well known, the eastward push of the Japan- or Kuroshiwo-Current is blocked by the Northwest American coast and forced to turn in a broad sweep bearing directly down upon Hawaii.

And along with this vast ocean current blows the prevailing wind. One can draw a straight line right from the Northwest American Archipelago to Hawaii, Central Polynesia, and New Zealand, and this line marks the direction of the predominant and prevailing wind direction in this part of the ocean, namely the northeast trade wind. Gaining full strength somewhere in the ocean southwest of Vancouver Island and more than a thousand miles northeast of Hawaii, this wind continues right across the equator towards the Maori habitat. Best (1925 a), an expert on Maori craft, poin tsto the existence of this strong and enduring wind which so frequently blows uninterruptedly from the Hawaiian settlements in northeast Polynesia to those of the distant Maori in southwest Polynesia, and finds it "a noticeable fact in connection with the migration of the Maori race and the peopling of New Zealand by it."

In judging of the mere feasibility of a crossing from the aboriginal Northwest American Archipelago to Hawaii in native craft, we shall recall that the sea-going canoes of the Haida and Kwakiutl were—in size, capacity and construction—not inferior to the best seagoing craft in Polynesia. We also know that any floating object approaching Hawaii from Northwest America will have its travelling mileage reduced by the local current, and will furthermore, at least for the last two-thirds of the voyage, have as much benefit from the northeast tradewind as a canoe approaching Hawaii from Samoa or Central Polynesia will be impeded by it. Yet we know that the Polynesians, once both Hawaii and Central Polynesia were known to them and they knew just where to set their course, undertook frequent voyages "from Hawaii to Marquesas, Tahiti, Samoa, or vice versa" (Fornander 1878), distances which in purely measured mileage, without regard to wind and current, equal the transfer from Northwest America to Hawaii.

Northwest American driftwood in Hawaii

The practical implications of these purely geographical data are most apparent. In Hillebrand's *Flora of the Hawaiian Islands* (1888, p. 14) we read: "The Hawaiian group lies entirely within the domain of the Northeasterly Current of the Pacific ... which ... deposits driftwood of pine logs from the northwest coast of America on the shores of our islands [Hawaii] and those of the Marshall and Caroline group much farther on."

Not less suggestive is the following comment on aboriginal Hawaiian life in a Bishop Museum Handbook (1915, pt. I): "Canoes varied greatly in size from that capable of carrying one man to the gigantic war-canoes carrying fifty or more; the latter were generally made of pine drifted from the American coast."

Fornander (1878) points out that: "In older times the Hawaiians made long voyages to the south and west. Vancouver saw here a canoe 61 ft. in length that had been fashioned from a drift log of American pine." Byron (1826, p. 23) also wrote of aboriginal Hawaii: "It is remarkable that some of their canoes were built of pine-wood, which does not grow in any of the Islands. The trees are drifted thither, apparently from the N.W. coast of America. The great double canoe of Teraiopu was of two fine pine sticks that had been drifted to the Islands." The giant pines seen by Vancouver and Byron had been hollowed out only after their arrival in Hawaii. But nothing would have prevented a corresponding drift had they been made into canoes *before* leaving the Northwest American coast.

Handy (1930 b, p. 102) said concerning some modern drift voyagers in the extreme North Pacific: "Recently, in a talk given before the Anthropological Society of Hawaii, Mr. J. F. G. Stokes pointed out the significance of the fact that Japanese vessels have in our own times been known to be cast up on Hawaii with men still alive in them, after drifting in the Japan current all the way from the coast of Japan, by way of the North Pacific and the northwest coasts of America."[1]

In his own paper on the subject, Stokes (1934) pays much attention to the various currents around Hawaii, showing how they all reach the group from the American side. Of the tributary currents he stresses (*Ibid.*, pp. 2791, 2792) how only the Latin American branch reaches Hawaii: "A cultural influence from Central America or Mexico is possible." Whereas: "An influence through drifts on the north-equatorial counter current, which passes 10° south of Hawaii, does not seem probable." Stokes admits that impulses from Indonesia would only be likely provided they had come with the Japanese drift in the great northern circle by way of Northwest America. He does not believe there is any Japanese blood in Hawaii worth speaking of, as he finds no references to what may be Japanese castaways there before about 1600 A. D. But he feels that some culture traits might have spread from Japan to Northwest America and thence to Hawaii. He says in this respect:

"Most of the features referred to find analogies on the northwest coast of America—the region conveniently designated by Wissler as the 'Salmon Area',—and in Japan. The only direct evidence of human drifts, however, has been of Japanese—a matter of surprise in view of the shorter drifting distance from the Salmon Area. ... Drifts from the Salmon Area to Hawaii are lacking from historical records, but are suggested in the traditions and by certain cultural affinities."

Among the Northwest Indians the construction of aboriginal craft of sea-going size ceased abruptly shortly after European intervention; hence drift voyages by these mariners cannot be expected to enter the Pacific records of historic times.

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[1] Sayce (1933, p. 267) also quotes the Wellington press of November 1915: "Ten Japanese castaways blown off the Japanese coast in a gale three months ago were rescued by a fisheries patrol boat off the coast of British Columbia. In a small dismasted schooner they had drifted across the North Pacific for fifty days, subsisting on a little food and rain-water."

The strong similarity and often identity of Hawaiian and North American petroglyphs have impressed many. In describing a collection of petroglyphs in Kauai Island in the Hawaiian Group, Sharp (1898, p. 204) cites a letter from Farley, who thought it possible "that the pictures were done by a party of Northwest Indians, who could, I believe, easily, in their large canoes, sail or drift down to the islands with the currents, in a shorter time than a Japanese junk could. One can usually see half a dozen N. W. drift logs on the beach at Keoneloa. On the beaches of Niihau, some fifty miles away, hundreds of logs of Red Wood posts have been picked up a few months after freshets on the Pacific coast of the U. S. and B. C. had washed out the logging dams of the saw mills."

The lonely Hawaiian Group must originally have been discovered by weather-driven or refugee drift voyagers, or else, as a second and less convincing alternative, have been found on a premeditated voyage of discovery, carried out by seafaring mariners criss-crossing the far northeast Pacific in search for land. If it was discovered by drift voyagers, these could not have come from the south or south-west, but must have come with the current bearing down upon Hawaii from the direction of Northwest America. If it was discovered by a courageous exploring party, such an organized expedition also would have an easier and more natural access to Hawaii from Northwest America than from any other direction, including the Polynesian groups to the south.

Whereas the edge of the broad North Pacific current constantly sweeps along the shore of the Kwakiutl territory en route to the Hawaiian ocean, and thus was daily entered by Kwakiutl fishermen and travelling canoes, the trade wind does not commence until further into the Pacific. There is no prevailing wind in the Northwest Coast archipelago, although meteorological registers indicate that the northeast wind is most dominant on the outer islands.[1] But the warm current round the islands frequently brings a sudden dense fog and a very strong wind. Experienced local navigators have informed me that during the summer season, when the Indians were apt to go furthest out to sea, the grip of the northeast trade wind increases considerably towards these islands, trapping any storm-driven craft 300 or 400 miles off the coast, and blowing it straight down upon the row of Hawaiian islands.

Pollen diagrams and prehistoric trade wind activity in Hawaii

With these local weather conditions in the space between the islands which contain the maritime Kwakiutl and Hawaiian cultures, a stretch of ocean is a form of communication rather than of isolation.

Until a few years ago, the ethnologist did not anticipate that science would ever be able to furnish dependable information concerning peculiarities of Pacific weather before Europeans arrived on the scene, such as variations in Hawaiian wind-strength and wind-direction during the particular mediæval years when the Maori-Polynesians started their migrations. Such information, however, was made available when the prominent palynologist Selling (1948) presented his monograph *On the Late Quaternary History of the Hawaiian Vegetation*. In his chapter on "Late Quaternary Vegetation History and Pacific Ethnology", this author calls special attention to the direct bearing his discoveries have upon the climatic peculiarities of the periods when the Maori-Polynesians set out to discover their present islands. Stating that modern ethnologists agree that Polynesia was probably first peopled about the year 450 A. D. (Buck 1938 a, p. 249), Selling adds that it is now known that there seems to have been a second colonizing period about 1100-1300 A. D. It is with reference to this latter period, which represents the arrival and spread of the present Maori-Polynesian families, that Selling says (*Ibid.*, p. 129):

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[1] Poole (1872) published what is probably the first local wind statistics.

"The more or less complete isolation of the islands was, however, undoubtedly broken by a period of activity in the centuries around 1200 A. D., even though all dates are fluid, being based on the statements of the genealogies as to how many generations ago this took place. Buck (1939), to quote a modern authority, puts the beginning of this period at 'somewhere about the beginning of the twelfth century', and its end at ca. 1300 A. D. Emory (1928, p. 120; see also Cartwright 1933) also says that these centuries, 1100 to 1300 A. D. (32 to 24 generations respectively before 1900, allowing 25 years to a generation) 'witnessed a sudden beginning and abrupt ending of a period of remarkable voyaging between the Hawaiian group and the islands to the south'."

By applying, for the first time in the tropics, Lagerheim's and von Post's pollen-statistical method, Selling was able to show that this important ethnological migration period concurred with striking climatical changes which were clearly revealed by the vegetational changes in his pollen diagrams. His analysis of the frequency changes of pollen grains in the course of time (pollens preserved in a successive series of peat samples taken from sections of Hawaiian mountain bogs) showed a struggle for dominance through the times between the dry forest vegetation of the leeward (southwest) sides of the islands and the rain-forest vegetation typical of the windward northeast sides; this latter vegetation is conditioned by the more or less continuous rainfall of the dominant northeast trade wind. The author detected the local existence of two extremely dry periods, each followed by a period of typical rain-forest with strong northeast trade wind activity and excessive rain. He concludes in his own résumé (*Ibid.*, p. 140):

"The climatic and vegetational changes deduced from the pollen diagrams have not failed to affect Polynesian life. A general similarity between the climatic waves and the stages in the history of the Polynesian migrations is emphasized. A connection between the last nadir of the climatic fluctuations in Period III and the end of the last great Polynesian migration (estimated at about 1300 A. D.) is in sight even though at the moment it is impossible to settle the question of exactly how it worked."

In a later article called "The Rhythm of the Pacific", Selling (1950) reassumes the assertion that the climatic curves revealed by Hawaiian pollen analysis must have influenced the life of local aboriginal fishermen. He says: "It is obvious that such changes cannot have passed without affecting the life of the natives, particularly as the Polynesians subsisted from fishing and agriculture, and I have associated the mentioning in the traditions of bad years and sufferings with the climatic changes of the Middle Ages. In general, a rhythmic concurrence exists between climate and culture. It seems possible that the termination of the lively Polynesian seafaring at the beginning of the fourteenth century may be the result of heavy gales and altered wind conditions in that area where the highpressure once was powerful and the trade wind blew steadily. ... Perhaps even the commencement of the great Polynesian sea faring era (1100- ca 1300 A. D.) had a climatic background. The diagrams show during this period an increased trade wind activity. The North Pacific high pressure area may presumably have been better developed and extended further to the north."

Selling states that his Hawaiian pollen diagrams show amplitudes agreeing with corresponding curves both from Northwest America and New Zealand, and referring to the possibility, as put forward by the present author, of a cultural transfer by Northwest Coast craft reaching Hawaii just in this period, he adds: "During this relatively brief period, easier than during the adjoining climatic periods, their [the N. W. Indian] canoes might have been trapped by the high pressure northeast winds and cooperating currents. And a comparatively constant trade wind can have simplified even further the connection between the Canadian coast and Hawaii, . . ."

Voyaging possibilities to and from Hawaii

We have seen that in the early years preceeding European intervention the Haida, Kwakiutl, Nootka, and other surrounding nations had developed a craft corresponding to the largest sea-going canoes in Polynesia. A good-sized single Northwest Coast canoe could carry upwards of 100 Indians (Bancroft 1875) and a large quantity of provisions. The term "canoe", if not directly a misnomer, is therefore at least misleading when applied to the enormous dugout craft of Northwest America and Polynesia, which were as large as the ships of the Vikings.

Captain Voss (1926) procured a small-sized (38ft) Northwest Indian canoe at Vancouver Island and fitted it with deck and sailing tackle. He left the Northwest Coast with one companion, sailing from Vancouver Island to land directly in Tongareva of Central Polynesia two months later. Thence he pushed on to New Zealand, and, still with the full benefit of the trade wind, to South Africa, from where he maneouvred the craft to England. He declared from experience that: "a small vessel is just as safe in a heavy gale as a larger one, and a good deal safer than many of them." His Northwest Coast canoe, the *Tilikum*, is on permanent exhibition near his starting point, in Thunderbird Park, Victoria, B. C.

For comparison, we may look across the Pacific to the Philippine-Caroline area, where Captain de Bisschop (1939) spent three years in a Chinese junk making nautical surveys of the socalled "Equatorial counter-current" to study its effect upon the alleged Indo-Asiatic migrations into the open Pacific. De Bisschop states that he was here constantly opposed by the trade wind and the everpresent Equatorial currents, which overran the supposed counterstream and made it seem a purely theoretical factor. His practical experience on the usefulness of the counter-current was in the end that (*Ibid.*, p. 58): "... very little can be said as well about the speed as about the direction of this current, indeed even concerning its existence!"

From his marine experience in the West Pacific de Bisschop ridicules the loose theories concerning the ethnological value of the Equatorial counter-current, and reproaches the speculative conclusions of such Pacific scholars as have overlooked the need for a serious study of the nautical conditions bearing upon the Pacific migration problem.

De Bisschop (*Ibid.*) next went to the other end of the same ocean and built himself a Polynesian double canoe in Hawaii to make a practical study of what ocean voyaging was like to those aboriginals who had discovered and settled Polynesia in such craft. He embarked in Hawaii and left himself to the mercy of the winds until he passed Polynesia and ended up on Futuna Island, west of Fiji, after a total journey of 36 days. Thence he pushed on with the trade winds and ended up in Soerabaya, in Java, after less than three weeks. Later, he went on westward round the world, past Madagascar to Cape Town and Europe.

His own practical experiences caused de Bisschop to lose all faith in the Malay migration doctrine, and to hold that, if there had been any maritime transfer in the West Pacific, Indonesia must have been affected from Polynesia rather than vice versa. Speaking, not as an expert on verbal inflexions or cranial shapes, but as an authority in his own field of experience—aboriginal migration possibilities into and out of the mid-Pacific—de Bisschop (*Ibid.*, p. 57) asserts: "... the generally accepted theory of a peopling of Polynesia from Malaysia—or from any other human centre in the west—is difficult to conceive, I could even say, it is inconceivable! As a seaman, I have primarily strived to study and throw light on the maritime difficulties of such a migration; they are numerous, very numerous, too numerous!"

This statement is the result of an empiric approach to *each* of the two sides of the migration problem, and not a theoretical proposal born of speculation and desire. The voyages of Voss from the Northwest Coast Archipelago to Polynesia in a converted Northwest Indian canoe, and of de Bisschop from Hawaii to Central Polynesia, Melanesia, and Java in a Hawaiian double canoe, have much to tell us concerning the natural trend of primitive migrations in this ocean—too much, indeed, to be overlooked by a student of oceanic relations.

Travelling and storage in Northwest Coast canoes

We should not deceive ourselves by judging the seamanship of past inhabitants of the Northwest Coast Archipelago by that of the surviving aboriginals in the local Indian reservations of our time. If we were to judge the seafaring ancestry of the Maori-Polynesian race by their present mid-Pacific descendants, we should be equally mistaken, for they have today neither the craft nor the ability to leave out of sight their own familiar lagoons and beaches. But unless the ancestors of both the present Northwest Indians and the Maori-Polynesians had once ranked among the world's leading seamen, they could never have developed a craft which is admitted to be one of the highest achievements in prehistoric naval architecture. We may also repeat once more what early writers like Lewis and Clarke stated about the Northwest Coast fishermen who were brought up as mariners from childhood, that "they ride with perfect safety the highest waves, and venture without the least concern in seas where other boats and seamen could not live an instant."

Cook (1784, Vol. II, p. 272), describing his arrival in Nootka Sound on the open Pacific coast of Vancouver Island, says: "We counted about a hundred canoes at one time, ..."—A fog and an off-shore gale was obviously all that was needed to start some of them on a drift voyage down upon Hawaii. In the course of centuries many a local craft must have been lost in the frequent fogs off these islands. When Captain Dixon (1789, p. 211) came to the same archipelago, he describes how about 36 natives came out to his ship in canoes when he was a couple of miles off land. They did not want to depart from the ship, and when Dixon set out to sea they followed him in their canoes, and succeeded in keeping up with his vessel. "At length, about ten o'clock, a very thick fog coming on, they left us, and paddled towards the shore: we were now at least eight miles distant from the coast, and it was a matter of doubt with many of us, whether these poor fellows would ever be able to find their way on shore, it being impossible to distinguish any object twenty fathoms a-head of the vessel." We learn from Dixon's log that this dense fog continued for the next six days.

Scouler (1841, p. 129) shows how the Haidas continued, long after the Europeans had arrived, to set out every autumn for the mainland with "fleets of from forty to fifty canoes" to "proceed to the different villages of the Chimmesyan nation",—visits which seldom ended without fighting. "They also manufacture and export canoes, and are themselves very venturous on the deep."

Niblack (1888) says of these canoe-builders: "They have the usual Indian stoicism under suffering, and bear extremes of cold, heat, hunger, and exposure with fortitude. They are quite venturesome, going well out to sea in their canoes. The Kaigani go out to Forrester's Island for bird's eggs every spring, 20 miles off the coast.—They often make trips of hundreds of miles along the coast..."

It is a popular belief that coastal navigation develops less seamanship than voyages in mid-ocean. The truth is the contrary, except when the water is directly sheltered. On the open and unsheltered west coasts of the Queen Charlotte and Vancouver Islands the Pacific is much more disturbed, and the tidal currents and backwash from cliffs and shallows far more treacherous, than anything to be experienced in the vast spaces of the open sea, with its regularly forward-rolling swells and wind-waves. Kwakiutl craft and seamen accustomed to the fury of Cape Scott and the famous seas of Queen Charlotte Sound, dreaded by modern travellers, could certainly master any sea in the pleasant trade wind belt to the south.

Ample fresh water supply and provisions were stored in the travelling canoes whenever the local navigators set out on longer expeditions, —for example, when they went exploring, as they did for the least speck of a bird island in the open ocean beyond their own sky, or when whole families moved their permanent habitat as we know them to have done (Barbeau 1945, p. 429), or when, like the Haida, they embarked in their big canoes for the purpose of trade and adventure on a thousand mile return trip to Puget Sound in Washington State. Fresh water was then carried in roomy waterproof bags precisely of the type used by Maori voyagers, made from closely plaited roots or seaweed. As in New Zealand, wooden water containers were also used, and the fresh water supply was kept up by collecting rain.

The staple provisions of a Kwakiutl canoe included large supplies of smoked or dried salmon and other varieties of fish, clams, seaweed, crab apples, roots and dried berries. Fermented roe, prepared like *poi* in Polynesia by burial in the ground, was also a favoured dish, and whale blubber was of some importance, at least on the west coast of Vancouver Island. That the Kwakiutl were experts in preserving food for long-term stowage may be judged from the eighty-page list given by Boas (1921, pp. 223-302) to cover their methods.

A people who sustained life ashore by ocean fishing would no more suffer from starvation at sea than would a hunter by getting lost in his own forest; and among drift voyagers of a nation that does not abhor cannibalism, one may always count on there being some survivors at the end of the journey.

The location of Hawaiki

We have hitherto taken it for granted that any voyage, accidental or intentional, from the Northwest Indian territory to Polynesia would first reach the Hawaiian group, since this 400-mile wide string of islands would be the nearest one to block the passage of voyagers entering the ocean from the northeast. As a contrast to its specific remoteness to any immigrants from India or tropical Malaysia, Hawaii would be the first island group found by a people coming from Northwest America, and, if our previous conclusions are correct, Hawaii must thus have been the first oceanic habitat and the local centre of diffusion for all Maori-Polynesian tribes further south. We shall proceed to test the possibility that Hawaii may actually be identified as the Maori-Polynesian centre of oceanic dispersion.

In various parts of Central Polynesia and also in New Zealand—*but not in Hawaii*—there are definite historical traditions of a Pacific island, or rather an island group, which was the original home of the tribal ancestors when they had first entered the spacious ocean from the continental outside world. In New Zealand we have seen that this first island Paradise was remembered as Hawaiki, on the other groups the name is rendered occasionally as Hawaiki, and occasionally as Hawaii, the consonant *k* being in these dialects merely omitted.

There are three islands in the Pacific which still today have a native name identifiable with that appearing in all these traditions, allowance being made for known dialectic variations in the Polynesian speech. These islands are Hawai'i in the Hawaiian Group, Savai'i in the Samoan Group, and Hapai in the Tonga Islands.

Savaii in the Samoan Group was once suspected of being the island referred to in the migration-traditions, since its location next to Melanesia would agree well with the current hypothesis of a Malay origin of the Maori-Polynesian tribes. But as Maori traditions speak of long oversea voyages undertaken by their forefathers between their own ancestral Hawaiki and the Samoan Group, Samoa itself could hardly be the place in question. When further Maori traditions give Rarotonga as an intermediate station for voyages from Hawaiki to New Zealand, and even distinguish Rarotonga by the descriptive name "The Road to Hawaiki" (Thomson 1871, p. 23), then both Savaii in Samoa and Hapai in the Tonga Islands are entirely out of question, and Hawaii in the Hawaiian Group is the only one of these islands that still makes sense.

The present Hawaii is furthermore located precisely where the Maori traditions placed the early Hawaiki. Shortland (1856, p. 2) narrated in his *Traditions and Superstitions of the New Zelanders*: "We learn from such authority that the ancestors of the present race came from a distant island named Hawaiki, lying in a northerly or northeasterly direction from New Zealand, or from a group of islands, one of which bore that name."

But once Savaii and Hapai had been found to be useless in the attempt at reconstruction, Hawaii in the north simply escaped the notice of the investigators, since an island high up in the northeast Pacific was incompatible with a theory of immigration starting in the tropical west. Thus, Hawaii of the Hawaiian Group is today still to be tested for possible identification with the Hawaiki or Hawaii in the traditions of the other islands. We may then, with Best (1925 a), first consider the Maoris' own historical version of their primeval settling of New Zealand:

When the early Maori ancestors still lived in the distant islands in the Hawaikian part of the ocean, a progenitor named Whatonga and a number of his friends went on a visit from an island called Ahu to the main island called Hawaiki, to take part in a canoe race. During the race a strong off-shore gale sprang up and carried Whatonga and other leading canoes away into the open ocean. Some of them were carried to the Samoan group, where castaways were subsequently found. But in the gale Whatonga's vessel became separated from the rest of the wind-driven canoes and, when the storm finally subsided, a sea fog prevented all observations of sun and stars, and aimless paddling resulted. When the fog lifted, land was seen at some distance, which appeared to be Rangiatea (Raiatea) just west of Tahiti. After a prolonged sojourn on this island, Whatonga managed at last to return to Hawaiki. In the meantime, when the gale had abated in Hawaiki, the friends of the lost voyagers manned several canoes to go in search of them. Toi, Whatonga's grandfather, set off across the sea and finally reached the Samoan Group. Not finding Whatonga there among the other castaways, he went to Rarotonga, but still in vain. He then resolved to carry his search straight down into the southern ocean, and thus he discovered the Chatham Islands, whence he navigated about the southern ocean till he sighted the clouds over New Zealand. He made his first landfall at Tamaki in New Zealand, and settled with his crew in Whakatane. Thus Whatonga, on his arrival home in Hawaiki found that Toi had gone in search of him and had never returned. So he in turn produced a deep-sea canoe named *Te Hawai*, and after long voyaging he reached Rarotonga and thence New Zealand, where the two ancient navigators finally met.

This Maori tradition was painfully memorized by every generation among the subsequent occupants of the island. If it be analysed, we learn that the Maori give Whatonga's home in the Hawaikian group as an island named *Ahu*, whence he went to take part in the canoe race on the principal island, *Hawaiki*. Ahu is easily identified, since we know that: "The island Oahu, upon which Honolulu is situated, was originally called Ahu, the 'O' being prefixed subsequently." (Andersen 1928, p. 41.)

Ahu and Hawaiki, in the distant group remembered by Maori history, are the original and early Hawaiian names for Oahu and Hawaii, two of the major islands in their own Northeast Pacific habitat. And only from Hawaii in the North Pacific could drift voyagers simultaneously end up in Samoa and Raiatea, while an intelligent search party following behind, with the main direction of the wind as their only clue, would first search in Samoa, then in Rarotonga, and then proceed straight down to discover the Chatham Islands and New Zealand.

A corresponding indication is given in Tahiti, where a tradition is preserved of the navigator Tangiia who sailed to Hawaiki for a visit, or, as it is pronounced in the Society Islands, Hawai'i. On his return voyage to Tahiti he *missed his landfall*, and thus continued straight on into the icy waters of the Antarctic, until he returned and came back to Tahiti. This does clearly show that Hawai'i must be located somewhere *north* of Tahiti.

Maori traditions also state that, during the generations after the discovery of New Zealand, Maori navigators undertook several return voyages to visit the distant islands of Hawaiki. As stated above, Rarotonga served as intermediate stop on these voyages, and was poetically named "The Road to Hawaiki". Now, Rarotonga is of all main central Polynesian islands the one best suited for a Maori navigator who wants to find his bearing to Hawaii, since Rarotonga and Hawaii have the same longitude, permitting a mariner like the Maori, without compass, simply to follow the Rarotonga-Hawaiian meridian by steering due north, watching the culmination of sun and stars. In fact, the moment a northbound voyager from Rarotonga island passes the Equator, the Pole Star will reveal the location of the Hawaiian Group throughout the night.

A singular coincidence actually proves that Maori navigators were struggling due north from Rarotonga just in the period of unrest when Maori traditions declared that their forefathers made the return journeys to Hawaiki.

Gudgeon (1904, p. 265) presents the following interesting note in an early volume of the Journal of the Polynesian Society: "It is a very singular thing that the people of Pennrhyn (Tangarewa) and Manihiki islands, lying north of Rarotonga, insist that their ancestors came from Hawaiiki-Tautau (which is the Rarotongan name for New Zealand)... Before the time of Rangiia and Karika of Rarotonga (ca. 1250), people came to these Northern islands from New Zealand." (The same information is repeated by Gill [1915, p. 151].) What would Maori navigators do 700—800 miles due north of Rarotonga, with the best part of the way to Hawaii already behind them, if they were not heading for Hawaii? And why do not Maori traditions tell of voyagers heading for Hawaii, if it is not because Hawaii to them is the same as Hawaiki?

We may quote the following most interesting reference as rendered by Emory (1942 a, p. 201): "In the Annual report of the Hawaiian Historical Society for 1920, it is worth noting the following: 'A number of Maoris from New Zealand were in Honolulu last spring. It was interesting to watch some of the Hawaiians trace the race connection between themselves and the Maoris, and also to note the confidence with which the Maoris confused the ancient Hawaiki of Asia with the Hawaiian islands.' "

I fail to see just why it should be the *Maori* who is confused concerning Hawaiki. After all, *we* know nothing of Hawaiki except what *he* has told us about it. And, have we any substitute to offer anywhere in Asia? If Hawaiki was in Asia and not in Hawaii, why did Toi and Whatonga, after the storm, look for each other on the wrong side of Australia, that is in Samoa and New Zealand, and not in Malay waters or the Palaus? And how did Tangiia aim for Tahiti and yet get south into the Antarctic? If the thirteenth century Maori supposedly went on visits to their fathers' abode in distant Asia, why did they travel about with neolithic *mere*-clubs and elbow adze, and why did they go by way of Rarotonga? The Maoris went from New Zealand to Hawaiki when the Venetian traveller Marco Polo went from Italy to Asia, but their respective loval experiences were certainly not the same. The Maoris visited their own kin and culture, and encountered no foreign Malays, Hindus, or Chinese, nor any land of glittering jewels, glamour, and mediæval Eastern civilization.

The Maori sailing directions to Hawaiki

Let us return to the Maori's own version, inherited verbally and preserved with reverence directly from those who actually undertook the journeys in question.

In his *Myths and Legends of the Polynesians*, Andersen (1928, p. 41) shows that the Maoris have thoroughly memorized and preserved the early sailing directions from Hawaiki to New Zealand; these they attribute to the early voyager Kupe, who had himself arrived from Hawaiki.[1] Without any view on Maori-Polynesian origins, Andersen merely analyses the practical information to be gathered from this traditionally communicated knowledge. He finds at once that in this old description of the route from Hawaiki to their present abode, the Maoris "had preserved the sailing direction from the Sandwich Islands to New Zealand".

This discovery was made by "comparing notes" between Maori and Hawaiian traditional accounts. Just as the early Maoris had preserved their sailing directions from Hawaiki to New Zealand, so too had the Hawaiian traditions preserved the sailing directions from their own group to distant southern lands. In the Hawaiian chain of islands between Oahu and Hawaii lies the island of Maui, and to the side of Maui are two small islets. These represent, according to Hawaiian traditions, the conventional starting-point for their early navigators when they set out for the distant southern lands, and from this point the steersman was to keep the course with Hoku-paa, the Pole Star, right at his back.

Now, the Maoris state that the traditional voyages from Hawaiki to New Zealand fell into two parts. When leaving Hawaiki "the bows of the canoes must be directed straight south from Maui-taha and Maui-pae", which according to the Maoris were two twin islets in the Hawaiki group. Both *taha* and *pae* mean "to the side", and the name of the two islets are therefore given as "Maui-to-the-side" or "to-the-side-of-Maui", in full agreement with the two islets to the side of Maui island in the Hawaiian group, where the Hawaiians tell us that all voyages from their group were to start. As the Hawaiians set their course by keeping the Pole Star right at their backs, so do the Maori claim that the first part of the journey from Hawaiki went "straight to the south" from the twin islets to-the-side-of-Maui in Hawaiki. The second part of the journey had a different course, as the voyager now turned to keep his bow "a little to the left of the setting sun".

The above is an exact sailing direction straight down from the conventionally selected starting point near Maui in the Hawaiian Group, due south to Rarotonga ("The Road to Hawaiki"), and then southwest, to the left of the setting sun, to New Zealand. With such exact Maori information it is apparent enough that the Maori Hawaiki is identical with the present Hawaiian Islands, which have the correct geographical location and in addition contain the islands of Hawai(k)i, (O)Ahu, and Maui with its two islets, as recorded in Maori historical traditions.

Maori genealogy begins in Hawaii

Further supporting evidence is somewhat reluctantly offered by Fornander (1878, Vol. I, p. 203), who looked to Southern Arabia for the source of Maori migrations. Familiar with Hawaiian genealogy, he says about the Maori: "... among other prominent names occuring in their ancestral tales, previous to their departure from Hawaiki, are four that appear also on the Hawaiian *Ulu* line between *Aikanaka* and *Paumakua*. In the New

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[1] According to Maori traditions, Kupe was the first local visitor from Hawaiki, but he returned without leaving any settlers in New Zealand. However, tradition preserved the memory of his route for the benefit of those who would sail from Hawaiki to settle New Zealand many generations later. Based on Maori genealogy, Kupe's visit is dated at about A. D. 950; Toi's arrival at about A. D. 1150; and finally, about A. D. 1350, the "Hawaiki Fleet" brought to a close a general period of migration from Polynesia. (Duff 1949, p. 173; etc.)

Zealand legends they appear as chiefs or *Ariki* of *Hawaiki*, following one another in the same succession as on the Hawaiian genealogy. Their names are—the Hawaiian pronounciation in brackets—*Hema* (Hema), *Tawhaki* (Kahai), *Whahieroa* (Whahieloa), *Raka* (Laka)."

In his attempt to bring the Maori in from the west, Fornander had expected to find the Maori ancestors in the genealogy of Savaii of Samoa rather than in Hawaii, but since this expectation failed, he has to admit (*Ibid.*): "It is hardly historically possible that there could have been two series of chiefs in the Samoan and Hawaiian groups, with identical names and in the same succession; with one transposition alone, the same identity holds good in the names of three of their wives, . . ."

Since a successive line of chieftains and chieftainesses remembered in Maori history as rulers in Hawaiki actually reappears as local rulers in the Hawaiian line, but is unknown in Samoa,—Hawaii and not Samoa must have been the ancestral Hawaiki remembered by the Maori.

Fornander also mentions that the Hawaiians have a tradition of an early local chief named Paao, who in the end left the Hawaiian Group to seek a new settlement in distant lands. The author compares this Hawaiian tradition with a *Maori* tradition of certain ancestral incidents *in early Hawaiki*, and finds the resemblance so marked "that it is easy to recognize that both legends are but different versions of one and the same event".

Another well known Polynesian genealogist, Percy Smith (1910 a, p. 125), who no more than Fornander suspected the northerly located Hawaii to be the gateway of Maori-Polynesians into the East Pacific, wrote: "Amongst the notable Hawaiian chiefs who, about the years 1100 to 1200, were constantly passing from the Northern Group to Tahiti and the neighbouring islands, was one named 'Olopana, whose wife was Lu'ukia." He shows that according to Hawaiian tradition they finally left Hawaii to seek a new home in the Southern Islands. Further: "Now 'Olopana's and his wife's names, if converted into Maori by known letter changes, would be Koropanga and Rukutia. As a matter of fact we do find in Maori history the names of Tu-te-Koropanga, whose wife was Rukutia, and that they lived in Hawaiki..."

Smith shows that, just as the Hawaiian tradition tells how this great local chief in the end left Hawaii with his wife to find a new and permanent abode in southern lands, so also Maori tradition states that their ancestral chief with the same name left Hawaiki with a wife of the same name to settle permanently in the South Island of New Zealand, where after arriving in the Matiti canoe before the great fleet, they became the ancestors of the local Waitaha tribe.

Further: "With respect to the above table, Olopana and his wife Lu'ukia lived either twenty-six or twenty-eight generations ago, according to which of the Hawaiian lines is taken. That these people are identical with Tu-te-Koropanga and his wife Rukutia of Maori history must be taken for almost certain, for it is extremely improbable that two men of the same name should marry wives of the same name—and their period is the same."

The author strengthens his argument still further by showing that this same chieftainess is in Hawaiian traditions credited with having invented the female dress called pau, still used by the Hawaiian women, while in a Maori song appear the words: "Gird thee with the dress (mat) of Rukutia."

Smith (*Ibid.*, p. 33) adds: "We may possibly see another connection between Hawaiian and Maori ancestors about this time in the name Pau-Matua (Paumakua in Hawaiian)." Paumakua is the chieftain following directly after Hema, Kahaki, Whahieloa, and Laka in the Hawaiian line, all of whom, we have seen, are remembered in New Zealand as great chiefs in Hawaiki. Pointing out that the Maori Pau-Matua and the Hawaiian Paumakua must have flourished very nearly at the same time, Smith finds it "a strong possibility that they were the same individual."

These observations by Fornander and Percy Smith are the more remarkable since neither of these genealogists suspected the Maoris to have come in from the extreme northeast of the Pacific.

The memorized Maori names and geographical location of the islands in the ancestral Hawaiki group, the exactly preserved sailing directions from these islands, the concurrence of genealogical names for early Hawaikian and Hawaiian chiefs, and the opinion of the natives themselves, singly and together point to a former Maori arrival directly from the northern Hawaiian Group. We even learn from the time of the European discovery of Hawaii that "the natives of the Sandwich Islands approach nearer to the New Zealanders, in their manners and customs, then to either of their less distant neighbours of the Society or Friendly Islands". (Cook 1784, Vol. III, p. 139.)

From the Society Islands we have already mentioned how Tangiia must have followed a south-bound course from Hawai'i to enter the icy Antarctic when missing his landfall in Tahiti. Best (1923 b, p. 12) points out: "The Tahitians give Hawai'i as the name of their original home-land, their dialect having dropped the letter *k*."

On two of the neighbouring Society Islands, Borabora and Raiatea, a chief named Raa is remembered as the great local progenitor, and again Fornander writes: "The establishment of this line of chiefs on Raiatea coincides in a remarkable manner as to name, time, and some other circumstances with the well-known Hawaiian chief Laa, surnamed Mai-Kahiki..."

In the Marquesas Group the natives directly render *Hawaii* as the name of the islands whence their ancestors had come, just as in the Society Island dialects, and not suspecting a Polynesian route from the extreme Northeast Pacific at the time when I lived among these natives in 1937—38, I was rather puzzled by the confidence with which they associated their traditional Hawaii with the now known Hawaiian Group to the north.

Next to Polynesia lie the Micronesian Gilbert Islands, where we find a strong infusion of Polynesian blood. The local islanders do not speak of Hawaiki, but name *Kainakaki* as their traditional ancestral abode. Krämer (1906) draws attention to *Kaunakakai*, the main port in the south coast of Molokai in the Hawaiian group, and adds: "Kainakaki, according to Wilkes the Elysium or Hawaiki in the language of the Gilbert islanders, is presumably the same word."

No Hawaiian tradition of Hawaiki

In view of the importance of Hawaiki, or occasionally some intermediate island group, in the traditional history of the Maori and his tropical relatives, it is most suggestive to note with Fornander and Smith (1910 a, p. 216) that "the Hawaiians have no tradition of any Hawaiki in the Pacific..." According to Hawaiian traditions, their own islands, as opposed to all the rest to the south, were the ones first discovered and settled in the open ocean.

It is equally interesting to note that the known Polynesian migratory period of about 1100—1300 A.D. was principally centred just in Hawaii. From Hawaii emigrants actually went to colonize the various islands further south, whereas daring voyagers from the Marquesas, Tahiti, Rarotonga, Samoa, etc. went back to visit relatives in Hawaii. These stirring activities coincide in time entirely with the period when, according to all Central Polynesians, their ancestors came from Hawaiki and subsequently returned to visit that celebrated spot.

The fact that *Hawaiki* was a lonely group, assembled outside the myriads of other Polynesian islands and atolls, is judged from the frequent reference to "the islands of the Hawaikian sea". They were remote, and yet solely inhabited by Polynesian relatives, with the same speech, dress and culture as on all the other Polynesian islands.

With the Maori-Polynesian centre of diffusion and first oceanic settlement traced back to lonely Hawaii in the extreme northeast Pacific, we have removed the Maori ancestors far from the Malays, and traced them back two-thirds of the way up towards the Kwakiutl habitat. We shall now examine Hawaiian traditions for traces that may take us right back to the mainland.

Fornander (1878, Vol. I, p. 22) writes: "The Hawaiian traditions which bear upon the origin of the islands and the derivation of the inhabitants are many and diversified, both in substance and colouring. National or dynastic vanity and priestly speculations have apparently at different periods re-cast and re-arranged some old primordial tradition, . . ."

Notwithstanding the veil of fancy cast over these primordial memories, Fornander (*Ibid.*, p. 25) shows that the actual discovery of Hawaii is ascribed to a mythical "wandering chief", who came from a vast island or mainland which was never mentioned by its real name, but only alluded to as the lost home of *Kane*. As Fornander (*Ibid.*) says, "*Moku-Huna* or *Aina-Huna-a-Kane*, 'the hidden, concealed land of Kane', was as much a reality as the existence of Kane himself. ... In the Hawaiian traditions its situation was vaguely indicated to be in a north-westerly direction from the group or the particular island of the beholder, and though firmly believed in, yet the belief seldom stimulated to action."

The vague notion that their forefathers had not come from Central Polynesia, but that Kane's hidden land lay in still higher latitudes, shows that Hawaii had originally been reached by drift voyagers or castaways who had not governed their own course and hence were unable to find the way back. Nor, to any voyager arriving in the tropical Paradise of Hawaii, would a return voyage to the wintry north be as tempting as a further easy push with the trade wind to the warm south. Hence Hawaii, *alias* Hawaiki, would naturally remain as the Paradise of all Polynesians, while details concerning earlier abodes further north vanished into obscurity.

Hawaii the straits and iki the volcano

The great "wandering chief" who is said to have discovered the Hawaiian islands is alluded to as *Hawaii-loa*, or "*Hawaii-the-great*", but his name is also repeatedly given as *Ke Kowa-o-Hawaii*, or "The Straits of Hawaii". (Fornander 1878, Vol. I, p. 23,25.) The island Hawaii was named after this mythical wanderer, and hence the name must be a very ancient one brought to Hawaii by its early settlers.

Fornander himself was sufficiently familiar with the Polynesian predilection for allegories and symbolic names to realize that "the Straits of Hawaii" was merely a poetical device, a descriptive mythical name personified in the local discoverer, and he proceeded to trace its possible origin. He and others have shown that *Hawaii, alias Hawaiki*, is a composite name, consisting of a root with the suffix *ii, alias iki. Iki* is the original form, and *ii* the result of a later dropping of the letter *k*. Philologists have suggested two possible meanings for this suffix; on the one hand "small" or "little"; on the other "furious" or "raging" as referring to a volcano in eruption. The improbability of the first of these meanings is apparent from the old Polynesian use of words like *Hawaii-loa* and *Hawaii-nui*, which would produce the senseless suffix "Little-Great". And, as shown by Fornander (*Ibid.*, p. 6), a Marquesan tradition shows plainly that *ii* refers to a volcano: "...in a chant of that people, referring to the wanderings of their forefathers, and giving a description of that special Hawaii on which they once dwelt, it is mentioned as: *Taï mamao, uta oa tu te Ii*; 'a distant sea (or far off region), away inland stands the volcano (the furious, the raging)'." [1]

Thereupon Fornander and others with him removed the epithet *ii* or *iki*, and looked to the west for a place-name equivalent to *Hawa* (of *Hawa*ii), *Sava* (of *Sava*ii), or *Hapa* (of *Hapa*i). Suspicion naturally fell on *Java*, and the name of this island was by many considered the clue to the "whence" of the Maori-Polynesian ancestors. After jumping a good 6 000 miles from Hawaii to Java, he then took a furher leap of 5 000 miles back to Zaba, the early seat of Cushite empire in Arabia, as the ancestral starting point. However, finding nowhere any "Strait" with a name equivalent to *Hawa* or *Hawaii*, Fornander (p. 25) simply suggests that the allegoric reference to the Hawaiian discoverer as "the Straits of Hawaii" must refer to the Hawaiian memory of a now lost name for the Straits of Sunda between Java and Sumatra. Here the question was left.

Taking up Fornander's original clue, the present author suspected that *Hawai* (or *Savai, Hapai*) might have been the old root from which the name sprang, rather than *Hawa*. As stated earlier, Whatonga's legendary canoe in Hawaiki was named *Te Hawai*, not *Te Hawa* nor *Te Hawaiki*; and in Hawaii ancient place-names like *Kaha-hawai*, *Puna-hawai*, etc. are found. Even more suggestive is the fact that, as stated, the epithet *ii* or *iki* refers to a raging, active volcano, of which there are none in Polynesia outside the Hawaiian and Samoan groups and New Zealand. There are two in Hawaii in the Hawaiian Group, and another in Savaii in the Samoan Group, but there is none in Hapai in the Tonga Islands. Therefore, Hawaii and Savaii, but not Hapai, have been given the suffix *ii*, denoting a volcano. Yet, even without the *ii*, this Tonga island is known as *Hapai* and not as *Hapa*, quite in keeping with the name of Whatonga's canoe *Te Hawai* from Hawaiki.

The reduction of a consonant, changing *Hawaiki* to *Hawai'i* and *Hapaiki* to *Hapai'i*, is a well known process in Polynesian speech, but no Polynesian dialect would abbreviate *Hapai'i* to *Hapai*. On the other hand, *Hapai* may very well be the root of *Hapai-iki*, and the canoe *Te Hawai* may be the root of *Te Hawai-iki*. Recalling at the same time the marked softening tendency throughout Polynesian speech, the *p* in *Hapai* is obviously an older form than *w* in *Hawaii.* On these premises I resumed the search outside Polynesia for *Hapai,* or even for the more guttural *Hakai.*

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[1] According to Henry (1928, p. 115, also Tahitian folklore often spoke of Hawaii Island as *Havai'i-a*, or "Burning Havai'i", due to its volcano which was formerly always brightly burning.

In a general world atlas (Philip 1934, p. 191) I checked up on the principal straits between the islands in the Northwest American Archipelago, and, between the Hunter and Calvert Islands, right in the midst of the Kwakiutl territory, was the *Hakai Strait.* If Hakai had been, for instance, in Europe or Argentina, or if it had been a mountain-ridge or an island, instead of a principal strait among the Northwest Indians of the particular Kwakiutl tribe, then it might well have been attributed to simple coincidence. But if we are actually looking for a certain strait with a certain name, located between the limited number of islands in Kwakiutl territory, and we actually find it there, that it be coincidence can no longer be considered.

The Salish intrusion of Bella Coola Valley

When I later went to the Kwakiutl Archipelago and the Hakai Strait, I learnt that to the local Indians Hakai was not just any casual channel; it was, and still is, one of the best known and most frequented Kwakiutl fishing-grounds. What is more, Hakai is the direct exit to the open Pacific from the only channel on the Northwest Coast where we have obvious proof of as yet unexplained tribal expulsions.

The mainland immediately behind the Hakai Strait is today the home of the Bella Coola Indians, who, ethnologically, do not belong to this locality at all. The Bella Coola Valley is in the centre of Kwakiutl territory, yet the Bella Coola Indians are not Kwakiutl, but are members of the large Salish stock which occupies the coast further south. The fact, that a strong wedge of an alien tribe is in possession of the principal valley inside the Kwakiutl section of the coast is well known to anthropologists. The only question not settled is whether the Salish of Bella Coola managed to wedge into their present habitat as the result of an inland migration or after a journey up the coast. And the only question not yet asked is: What happened to the former Kwakiutl inhabitants of this valley when the Salish intruders conquered it?

With large expances of level ground and with a wide river, rich in salmon, the Bella Coola Valley represents the most tempting settlement for any Indian war-party between the border of Alaska and the proper Salish territory in southern British Columbia. There is so little level ground on the mountainous, island-dotted British Columbian coast, that the great Kwakiutl people would never have left this principal coastal valley in their own midst unoccupied in expectation of a Salish intrusion from the south.

The Salish at Bella Coola, whether they had arrived by land or by sea, had, when they conquered the richest settlement on the local coast, succeeded in splitting the great Kwakiutl territory into two equal parts—one north and one south of the open Hakai Strait. (See map p. 80.)

There are only two exits from the deep, mountain-girt Bella Coola valley. A conquered people, forced into flight, might climb a precipitous mountain-path at the very top of the valley, and thus take refuge among alien Déné tribes on the inland plateau; otherwise they might embark in their canoes and escape into the Burke Channel. Any Northwest Coast tribe would unhesitatingly choose the latter alternative if defeated ashore; and craft leaving the beach at Bella Coola can only follow the Burke Channel—flanked by wild precipices and glaciers—till they reach the open Hakai Straits, the last gateway to the open Pacific. A fleeing tribe would take their wives and children on board to prevent their enslavement by enemy tribes. The only lateral exits from the precipitous Burke Channel are Kwatna Bay and the Dean Channel, both inhabited and fortified by other tribes. The refugees from Bella Coola Valley could find only temporary shelter in their own familiar fishing-grounds of the Hakai Strait, or they could continue into the open sea. If they moved on, they could perhaps have made a last call at Cape Scott at the northern tip of Vancouver Island; otherwise they would find no more land short of Hawaii.

There are still traces to-day of some ancient habitation on the coast of the Hakai Strait, although in historic times it has only served the surrounding tribes as a dependable fishing-ground and source of food. It may be worth while to note that in the dialect of the Marquesan islanders *hakai* means to "feed". In Easter Island the word reappears as *hagai*, which means "to feed, to nourish"; and at Mangareva as *agai*, "to give food to". In the Marquesas *kai* and *kai-kai* means to "eat"; and on the Northwest Coast *kaik* (Tsimsyan) and *ka-aia* (Tlingit) means "belly"; and *ka-ta* (Haida) means to "eat".

We have ample reason to suspect that the particular Hawai or Hapai Strait alluded to in the symbolic name of the Hawaiian discoverer is the Hakai Strait, the direct geographical link between the tribes driven away from prehistoric Bella Coola and those driven ashore in prehistoric Hawaii. It is well worth noticing that in historic times it is among the surrounding Kwakiutl, and not among the alien Bella Coola intruders, that we find the main bulk of Maori-Polynesian analogies; also that the Kwakiutl, according to Drucker's survey, represent the purest—and together with the Nootka perhaps also the oldest—aboriginal coast-dwellers in the present Northwest Indian habitat.

We have seen how the Maori and his kin are proud of their descent from the ancestral Paradise of Hawaiki, and can now well understand why the Hawaiians, who had no Hawaiki outside their own group, let "national and dynastic vanity" obscure their humiliating descent from defeated families driven from the northerly Hakai Strait. Percy Smith (1910 a, p. 125), however, found Maori-Polynesian historical traditions which directly admitted that it had originally been "great wars which caused the people to spread to all parts", and he even found "statements in most Maori traditions, that it was great wars that originated the migration, and it of course follows therefrom as a consequence that the Polynesian race were the defeated people, and had to depart".

Only refugees without choice take women into their canoes and let the wind and current at their will carry whole families away from their own homes and into the open spaces of an unexplored ocean. Dramatic expeditions of this sort, away from all familiar shores and into the endless uncharted water-spaces, represent compulsory drifts or at the best a choice of the lesser of two evils. Capitulation to a victorious war-party of Salish head-hunters would probably be the *larger* of *any* two evils.

PART IV

THE COMPLEXITY OF POLYNESIAN ORIGINS

THE COMPLEXITY OF POLYNESIAN ORIGINS

We have seen that Salish tribes invading and occupying the Bella Coola Valley may have started the human slide that brought Northwest Indians to Hawaii, and Hawaiians later to Central Polynesia and New Zealand, all at the beginning of the present millennium. The question now arises: did they find uninhabited land, or were other people already in possession of these far-away islands?

We may say without hesitation that the Northwest Indian element cannot be the only one to have entered the farflung islands of Polynesia.

We have shown how Polynesian genealogists agree that the first wave of immigrants must have settled Polynesia about the middle of the first millennium A. D., and we have in passing referred to the prehistoric remains on Easter Island and elsewhere, of whose origin the present Maori-Polynesians can give us very scanty information. We may state definitely that these deserted monuments are not of Northwest Indian character and workmanship, nor can they be credited with a Malay style and origin.

There are also physical types to be found sporadically on all these islands, including New Zealand, which do not concur with the predominant Maori-Polynesian type, and which accordingly do not find an analogy among the coast Indians of Northwest America, and still less among the Indo-Malays. Yet their entry into the East Pacific is so comparatively recent that, with the elimination of the characters and elements already discussed, their identification should be a much simpler matter.

Polynesia reached by different prehistoric settlers

During recent decades the theory of "eastward sweeping Malays" who developed into Polynesians merely by settling Polynesia has received another serious blow. As Handy (1930 b, p. 93) writes: "The more recent studies in Polynesian ethnology have complicated the matter even further by revealing the ancient Polynesians as composite in race, in culture, and in language."

It is primarily due to Sullivan's somatological analysis in Polynesia that the complexity of the Polynesian people has been established as a scientifically founded fact. Following his research into Samoan (1921), Tongan (1922), and Marquesan (1923) somatology, Sullivan (1923, p. 168) wrote: "The inter-island differences, in addition to other signs of variability, are indicative of a non-homogeneous group. The variability is too great and the inter-island differences too far reaching to be accounted for by mere local peculiarities. There is every indication that more than one physical type is under consideration."

The fact that the respective physical types appeared unevenly on different Polynesian islands proved to Sullivan (*Ibid.*, p. 215) that the racial mixture had not taken place *before* the dispersal into Polynesia, but that the "widely separated physical types came into Polynesia at different times and that whatever mixture has taken place has occurred within Polynesia".

Later Sullivan (1924 a, p. 22; 1924 b, p. 521) followed up his discoveries in his two papers "Race Types in Polynesia" and "The Racial Diversity of the Polynesian Peoples", in which he writes: "The now rapidly accumulating data on the biology of the inhabitants of Polynesia are beginning to indicate clearly that the 'Polynesians' are in no sense to be considered a uniform racial type. The 'Polynesian type' is an abstract concept into the composition of which have entered the characteristics of several physical types." Also: "...it is clear that they must have entered the Pacific at different times, and possibly by different routes. Certainly they must have had different languages and cultures."

No Polynesianist seems subsequently to have opposed Sullivan's established view, but the evidence indicating more than one wave of immigrants into Polynesia has gradually gained in strength. Handy (1930 c, p. 4) says in "The Problem of Polynesian Origins": "Sullivan, Dixon, and Shapiro have all indicated the composite nature of the racial type in Polynesia and the varying distribution of its distinctive elements. Dixon, Linton, and the present writer have analysed one or another phase of the culture and have demonstrated the presence of several distinct strata or groups of culture elements. And Churchill nearly twenty years ago segregated Polynesian linguistic elements into two distinct groups."

We may judge that the migration during the present millennium, which brought the Maori and his tropical Polynesian cousins down from *Hawaiki*, must have been the latest impulse of any importance to reach the islands before Europeans discovered them. This may be deduced from the absence from the carefully preserved Polynesian history of any reference to a subsequent arrival of other people, and secondly, from the more emphatic statements of the same historical traditions that when their own ancestors discovered the various islands, alien tribes already lived there. As will be seen, the Maori-Polynesian traditional memory on widely separated islands describes, not one, but two, mutually different peoples as living together on some islands at the time of their own arrival. As the verbally memorized descriptions of these people are remarkably consistent, and since they describe just those deviating types of natives still to-day traceable among the aborigines, they may at least give us some illustrative suggestions before we turn to more concrete evidence. We know Polynesian traditions to represent inherited history and religious allegories, and that, as Buck (1926 a, p. 203) says: "From a purely scientific point of view, tradition is of the greatest value in ethnological research regarding the Polynesian race."

Polynesian memories of a local dark-coloured race

Friederici (1915, p. 203) writes: "It has often been asserted, and again perhaps, just as often been denied, that the Polynesians upon their arrival in the Pacific found a dark-coloured race already in possession of the lands, even on the far out-lying atolls. If, the suggestion is that this people with the islands upon which it lived, represent the rest of a former sunken continent, i. e. a primeval homogeneous stratum of people, this view must be rejected to-day, as it has been before. However, the presence of dark-coloured, extra-Polynesian elements is established, not only in anthropological respect, as in New Zealand, Niue, Mangaia, Vaitupu, Tongarewa, Tahiti, the Tuamotus and the Hawaiian group, but, according to the statements in their own traditions and genealogies, the Polynesians have also found the islands reached by them—as New Zealand, Niue, Rarotonga, Tahiti, Hawaii—possessed by a dark-coloured population."

Maori history has preserved a vivid memory of this dark people which, it is maintained, inhabited part of New Zealand prior to their own arrival. Best (1925 a, p. 275) shows that the Maori newcomers have memorized them as "a spare, slim-slanked, and dark-skinned folk, with bushy or outstanding hair, having flat noses with upturned nostrils; an indolent and chilly people, fond of hugging the fireside. They had a curious habit of looking sideways out of the corners of their eyes, and were noted for treacherous behaviour. They built rude huts, and wore but little clothing, a rough cape in winter, and merely some leaves in summer."

These dark-skinned individuals are also mentioned as "speaking a strange tongue", or "a language unlike the Maori tongue..." (Dixon 1921, p. 88.) The Maoris further observed that: "They did not preserve their traditions as we do." (Whatahoro, quoted by Skinner 1923, p. 18.)

The Maoris, who themselves had well-developed noses and considered a high and narrow proboscis their racial ideal of beauty (Shapiro 1930, p. 281), described with much contempt the appearance of their dark predecessors with "flat noses and spreading nostrils"; "the nostrils seemed to be all the nose they had," states one account. (Best 1924, Vol. I, p. 5).

Dixon (1921, p. 82) presents a Maori tradition of some early people seen by their own ancestors when visiting Raiatea Island. These foreign people had "dark skins, and were very dark in colour, with the hair standing out from the head, the hair was very dark, the faces flat with flat noses, the nostrils flattened out below, with overhanging prominent eyebrows; their legs were thin, with small calves; they were lean, little flesh but much bone. They were quite small in stature."

The Polynesian settlers in Rarotonga "found a black people already there, and an earlier god, Rongo, a dark god, a god of cruelty and human sacrifices." (St. Johnston 1921, p. 280.)

This early, dark-skinned people, referred to in Rarotongan tradition under the name of *Manahune*, reappears in distant Tuamotu tradition and genealogy, referred to as *Manahune* in this place also. In this group such individuals are not merely traditional; they were seen and described even by early European visitors: "The natives seen by Beechey at Bow Island in the 'twenties' of last century are described by him as being of a repulsive type. 'Their noses were broad and flat, their eyes dull and sunken, their lips thick ... long bushy hair well saturated with dirt and vermin ... their limbs bony, their muscles flaccid.' And this is said of a people of the Paumotu Group, in Eastern Polynesia," writes Elsdon Best. (1923 a, p. 49.)

From the Marquesas Group we have an interesting concurrence of data. When the group was discovered by the Mendaña expedition in 1595, there happened to be a negro among the crew of the Admiral's ship. Seeing him, the natives at Tahuata Island explained through signs that to the south of their island there was land inhabited by such black men; that these used the bow and arrow; and that they were their enemies whom they occasionally visited for the purpose of war. What makes this incident the more interesting is the fact that in the direction given by these Polynesians, straight to the south of Tahuata, and on the nearest land there, the anthropologist is today confronted with what Friederici (1915, p. 204) terms "the foreign, darkcoloured elements in the remote Tuamotu-atolls of Reao, Pukarua, and Napuka".

The theory that the dark-coloured strain has a Melanesian origin

The identity of these foreign and dark-coloured, flat-nosed, thick-lipped, short-built, and bushy-haired aborigines, who occasionally fought with bow and arrow, has caused much controversy, and is not yet quite established. A majority of writers have unhesitantly ascribed to them a Melanesian origin. The great scarcity—and often absence—of the Old World B factor in Polynesia has in recent years greatly weakened this theory, unless it be admitted that the Melanesian element in Polynesia is only sporadic, and too limited to be counted as an impressive component in the local race. If it be correct that the dark-coloured natives seen on certain of the Polynesian islands by the Maori-Polynesian immigrants really were of Melanesian extraction, then one of the main problems seems to be how they could have left their own kin on the clustered islands next to Papuasia, to appear sporadically on oceanic islands far to the east. The Melanesians are not, and apparently never were, good seafarers and courageous explorers. The Maori-Polynesian sea-rovers, at the peak of their oceanic era, might well have raided the adjoining Melanesian islands for easily captured slaves; but it is expressly stated in all Maori-Polynesian traditions concerning this folk that the *Manahune* were one of the two alien peoples which dwelt on the islands before they themselves arrived. We shall therefore postpone this disputed diffusion problem until we have later considered also the second of the two early peoples.

Even in lonely Easter Island we find, as stressed by Routledge (1919, p. 221), that there are certain remarkably dark-coloured natives among the local Maori-Polynesian aborigines, a fact which has been commented upon from the early days of European discovery and admitted by the Easter Islanders themselves, who say that some of their early local forefathers had been "black". (Routledge 1919, p. 221.)

Turning now to another lonely Polynesian outpost, the Moriori settlements of the Chatham Islands, we learn from Scott (1893, p. 23) that: "According to their own traditions, their ancestors came from Hawaiki, some twenty-seven or twenty-eight generations ago. On arrival they found the islands thickly inhabited by natives who differed considerably from them, being darker, and having very black hair. After much fighting, they made peace with the islanders, and, intermarrying with them, the two races became fused. There is another tradition of the arrival of a second body of immigrants at a later date. These are said to have come from New Zealand. This traditional history tends to show that the Morioris, like the Maoris, are of a mixed Polynesian and Melanesian stock."

Even in Hawaii anthropologists have occasionally proposed Melanesian vestiges in the local tribes, while the native Hawaiians speak of a small people that retreated to the mountains of the interior until at last they died out in early ancestral times. They were known in Hawaiian history as *Menehune*, but nothing particularly is said about their skin colour. Degener (1949, p. 193) says about the traditional memory of this mythical race:

"Legends of Hawaii are replete with stories of dwarfs, called *menehune*. These little people did not have the choice of food plants of the later arrivals, but subsisted on the fruit of the pandanus, the pith of the tree-fern, the rootstock of the *ti*, and the berries of the ohelo or native huckleberry, and the akala or native raspberry. Most of the *menehune* stories centre about the island of Kauai. The stories are too frequent and detailed to be idle figments of the imagination. It is very likely that the illusive, dwarf *menehune* were earlier settlers who, to avoid detection and probable slaughter, were most active at night. Their last important stronghold was Kauai. Because of unusual ruins on barren Necker Island to the west, it is believed they were forced even to leave Kauai to find their last home there."

Percy Smith (1910 a, p. 140) identifies the Hawaiian *Menehune* with the *Manahune* or the "little people" found by the newcomers to Rarotonga and New Zealand, and states that both in Rarotongan and Maori dialect *manahune* means "a scab, or mark on the body". He adds: "It may be that the origin of the name is due to the people who bore it being marked with cicatrices (manahune). ...from Maori and Rarotongan accounts, they appear rather to have been an alien race.... The vague notions the Polynesians generally have in regard to the Manahune... seems to point to their having been a race living in the remote past conquered by the Polynesians, and probably often enslaved by them. In fact, the traditions no doubt point to the Papuan or Melanesian race, who, it is well known, mark their flesh in gashes as an ornament, instead of tattoo, as with the Polynesians."

In Tahiti I learnt from Mr. M. Jay of Tahaa that old natives until recent years recalled traditions about the *Manahune*, describing them as "black" men who had once lived in the interior of the island and who, when caught, were unable to make themselves understood, as they spoke a language which was quite different from the Tahitian. Handy (1930c, p. 5) writes from the same island: "Legendary lore, preserved in the form of chants, clearly indicates that this class termed manahune was descended from an earlier population that dwelt in the land prior to the arii conquest." He also found "numerous indications—archaeological, social, religious—pointing to two major phases of cultural history in the island prior to European contract. The Tahitians themselves divided their history into two periods..."

Shortly after Tahiti's discovery, Bougainville (Montémont 1834, Bk. 3, p. 237) made the following observation: "The people of Tahiti is composed of two very different races of mankind... The first, and that is the most numerous, shows men of taller stature; they are commonly about six feet and more.—Nothing distinguishes their features from those of the Europeans; and if they are dressed, if they live less in the open air and in strong sunshine, they are as white as we are. In general their hair is black. The second race is of a moderate stature, have frizzed hair tough as a mane; its colour and its traits differing but little from those of the mulatto."

In the Marquesas, Sullivan (1924 b, p. 521) found darker-skinned individuals dominant on some islands and lighter-skinned ones on others, and said: "...Dr. Handy has found differences in language and culture which correspond roughly to the distribution of the two physical types."

Dr. Ralph Linton has called my attention to a few Melanesian elements traceable in

Marquesan art; and during my stay there in 1937—38 I collected traditional accounts, on both Hivaoa and Fatuhiva, which described a smaller and darker population originally inhabiting these islands, but who, when the Polynesians arrived from Hawaii by sea, fled to the most inaccessible peaks and mountain ridges, where they fortified themselves with stoneworks and ditches. The Polynesians have shown me stone walls and fortifications attributed to this early alien people in the peaks above the Puamau valley on Hivaoa, and above the Omoa and Ouia valleys on Fatuhiva.

Dixon (1921, p. 83), realizing like Sullivan, Handy, and other modern Polynesianists, that more than one variety of mankind must have entered into the forming of the present Polynesian race, pointed to what he termed the Melanesian form of head, which appears sporadically among present Polynesians. He said: "The geographical distribution of crania of this type, as shown by the present study, seems to... lead to the conclusion that a stratum of relatively pure Austro-Melanesian type must have preceded the 'Polynesians' in Polynesia."

As early as 1911, Churchill segregated Polynesian linguistic elements into two distinct groups and claimed that the language indicated two separate eras in Polynesian history, the earliest of which seemed to contain traits of Melanesian speech elements.

Although the theory has never been generally accepted, it can hardly be denied that there is some evidence to support the ever recurrent view that the former occupants of Polynesia, in its primeval era, included some stray Melanesian elements unevenly distributed; but the importance of their occurence has probably been greatly overestimated. The fact that there was an evident strain of long-headed elements in Easter Island and many other parts of Polynesia, whereas the Malays were a distinctly short-headed people, has probably encouraged the claims of a strong Melanesian component in the Polynesian stock more than anything else. For the Melanesians were long-headed, and could have brought dolicocephaly into the East Pacific island world. However, we know today that the occurrence of dolicocephaly in Polynesia is not at all associated with other Melanesian elements (Métraux 1940; Shapiro 1943), and that, irrespective of our attitude towards the proposed existence of stray Melanesian elements in Polynesia, the important long-headed local form must have entered the far eastern islands from other territory than Melanesia. Since long-headed people with maritime culture occupied major sections of the Pacific coast of the New World east of Polynesia at the time of the first Polynesian migrations, we shall leave this question open until these eastern neighbours are also brought into the discussion. (Part V.)

The Manahune had a lower position in the community

Men and women would need seamanship and good boats to reach all these remote sections of Polynesia intentionally; and we may confidently state that Melanesian families, as they are known to us, could not, upon embarkation in Melanesian canoes and in Melanesian waters, travel alone on explorations—or drift voyages—against the direction of any natural flow of winds and currents, to settle, not only New Zealand—though this might have been feasible—but Rarotonga, the Marquesas Group, Easter Island, and Hawaii. Voyaging of this kind would certainly not be attempted by the Melanesians, and if so, it would far surpass their capacity.

There is only one logical conclusion to be drawn; if there were any Melanesians at all on these islands before the Maori-Polynesians came, their early companions—the creators of the cyclopean stone monuments found on some islands—must have been good seamen. Certainly they must have been in need of manual labour, if not slaves.

Irrespective of their racial origin, Handy (1930 c, p. 5) clearly shows the subordinate position of the early dark element in the Polynesian community: "At the time of discovery there existed in Tahiti a distinct class of the population, known as the *manahune*, that was subject to the land-owning group consisting of the *arii* (chiefs) and the *raatira* (landed proprietors). The *manahune* are said to have been the most numerous element in the native population. They had no individual land rights but were tenants or serfs of the *arii* and *raatira*, or else they lived in the inner valleys or on the plateaus. Traditions of the *arii* refer to them contemptuously as the valley-dwellers (*noho vao*), wood cutters, planters, eaters of fresh-water fish. They were the serfs, laborers, paddlers of the canoes of the *arii*."

Handy (1930 b, p. 94) also shows that the Manahune in Tahiti was directly addressed as "Thou slave of the Arii".[1]

The idea of the earliest Polynesian people raiding the occupants of the adjoining archipelago to satisfy their own requirements in labourers or slaves may at first sound rather fantastic, but in view of the Melanesian pig and breadfruit, which spread to Hawaii and other Polynesian outposts as as a result of Polynesian visits to marginal Melanesia, we cannot deny that casual trophies like slaves may have been carried back to Polynesia as "paddlers of the canoes" more conveniently than chickens and hogs.

The Caucasian element in Polynesia

We shall now turn our attention to another of the basic elements that seem to enter into the local composition of Polynesian race and culture. As Linton (1923, p. 447) puts it: "Recent studies of physical type have proved conclusively that the Polynesian are not a pure race but are made up of at least three racial elements."

Linton specifies these racial components in a "brachycephalic race with slight Mongoloid affinities", a "doliochocephalic negroid race", and a "dolichocephalic or mesocephalic race which shows Caucasic affinities".

He also says: "The frequency and distribution of the two non-negroid races seems to indicate that they entered the region in nearly pure form. All three races are present in most of the Polynesian islands but they vary in the proportion which they bear to the total population of each group."

Of these three distinguishable elements we have so far discussed two, the descendants of what appeared to be slightly Mongoloid Northwest Indians, and an earlier element occasionally proposed to be of Melanesian origin. It seems, therefore, that the third and Caucasoid element in question may refer to the second of the two early local peoples which the Maori-Polynesians claim to have found on their arrival in the islands.

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[1] The same author (1930 c, p. 6) states from Hawaii that, according to a local tradition "relative to the coming of the menehune to Hawaii... it sounds very much as if Hawaii was in need of cheap labour and imported it long before the era of sugar."

This modern division of the present Polynesian people into three separate root-stocks has remained practically unchanged in subsequent years. Bryan (1935, p. 60) sums up in the following words our present knowledge of the Polynesian people and its three racial components: "But the Polynesians are not a pure race. Extensive studies in nearly every part of Polynesia over a number of years show that they must be descended from Caucasian-like ancestors who mixed with Mongolian and Melanesian peoples in the course of their wanderings. Also, their ancestors probably did not all come into Polynesia at one time, but in three or more groups." Also (*Ibid.*, p. 65): "The Polynesian mixture is thought to be made up of three races: an outstanding element of some white stock, a strong admixture of mongoloid, and a perceptible strain of negroid, either Melanesian or Negrito."

These conclusions of modern physical anthropology fully support the statements of the early Spanish, British, and Dutch discoverers, that the islands of this ocean were occupied by a mixed population, containing light brownish, black, and reddish-white people. Eighty years ago, Thomson (1871, p. 30) said with emphasis: "*They are a mixed race*, and may be divided into brown, reddish, and black. In different tribes the numbers of each complexion vary."

Even before Thomson's day, the early New Zealand resident Polack (1838, Vol. I, p. 359) wrote: "The marked difference in the complexion, stature, and physical formation, of different tribes among the New Zealanders, would give ample reason to imagine this people were descended from decidedly different ancestry. Captain Crozet, in the 'Nouveau Voyage à la Mer du Sud', classifies them as three distinct races: white, or copper colour; brown; and black."

Reischek (1924) similarly describes the three distinct physical types of early Maoris. *The first*, which was by far the dominating type, was charactarised by well-proportioned, almost European features, straight, black hair, fair skin, and a stature of nearly six feet. This is the common type of the Maori, the dominant norm throughout the Polynesian islands, and the one we have followed back to certain island aborigines in the Northwest American archipelago. *The second type* was remarkably dark-skinned, with very flat and broad nose, thick lips, and more frizzy hair. This is the type which on some islands corresponds to the traditional Manahune or "little people", of possibly Melanesian descent. *The third type*, however, looked "Arabic-Semitic", had an almost reddish hair and an unusually fair skin.

The two last mentioned diverging types are pointed out by the Maori themselves, who claim that both are descended from two aboriginal peoples originally found by their ancestors when they first came to New Zealand. In this third type with its reddish hair, very fair skin, and strongly hooked nose, we recognize some of the strange non-Pacific or non-Yellow-brown racial peculiarities which have already been referred to in Polynesia, and which to some extent had even affected the Northwest American Indian and had changed him from a typical mongoloid or Yellow-brown type to one approaching the caucasic race. It looks as if a branch of this people, which had thus slightly affected the Northwest American Indian, might formerly have been present also in other parts of aboriginal America, and thence perhaps have entered the early East Pacific as a separate branch and in a much purer form.

The fair and red-haired element in Polynesia, and Polynesian traditions concerning its origin

Percy Smith (1910 a, p. 131) says about the Polynesian people: "All through the race, everywhere we meet with it, we find a strain of light-coloured people who are not Albinos, but have quite light hair and fair complexions. With the Maoris this strain often runs in families for many generations; at other times it appears as a probable reversion to the original type from which the strain was derived. There are also traditions amongst the Maoris of a race of 'gods' called Pakepakeha, who are said always to live on the sea, and are white in complexion—hence the name Pakeha they gave to the white man on first becoming acquinted with us in the eighteenth century."

He also writes (*Ibid.*, p. 133): "The Mangaian people, according to Dr. Wyatt Gill, call the *keu*, or light-coloured people, *Te Anau Keu a Tangaroa*, the light-coloured offspring of Tangaroa, the latter being their principal god, whilst he is the Neptune of the Maoris. We thus see that there is evidently a dim recollection of a white, or light-coloured, people retained in Polynesian traditions. When we come to inquire into the origin of this story, it is most natural to ascribe it to contact with a light-coloured race in very ancient times. It is difficult to conceive of a brown race inventing such a distinguishing racial characteristic had they not actually seen it."

Invention by the early Maoris of this feature of their traditions would not explain why the characteristics in question actually run in inherited strains through their own blood.

Best (1924, Vol. I, p. 7) says: "Among the black-haired natives of New Zealand a fair-skinned type with reddish hair of a wavy nature is extremely persistent, though it may miss a generation in a family. Such folk are not, however, numerous, though the strain is said to have come from Eastern Polynesia many generations ago. True albinism was but rarely seen here."

In his study of "Maori Somatology" Buck (1922, p. 38), too, points to the fairer skin and reddish hair that exist in some full-blooded Maori: "The Maoris themselves recognised various shades of skin colour. Several legends are extant concerning a red-haired, fair-skinned pre-Maori race known as Turehu or Patupaiarehe. One of these Patupaiarehe tribes was known as the Pakepakeha, and according to one theory this is the origin of the word Pakeha which is applied to the fair skinned European as distinguished from the darker skinned Maori. To this day it is a popular belief that where a fairer skin and reddish hair exist in full-blooded Maori, they are inherited from a Patupaiarehe ancestor. A fair skin is known as *Kiritea*. There is also a ruddier shade known as *Maurea*. With regard to the darker shades of skin, these are known as *Manauri* or *Parauri*. Some of the legends concerning the pre-Maori state that they were very dark skinned. A fair skin was admired whilst darker skinned people had, on occasions, to put up with the humorously disparaging remarks of their lighter tinted friends."

Buck (*Ibid.*, p. 40) also says of Maori hair: "The general colour is black, but brown and reddish hair occur. Certain tribes have been stated to have had more than their share of red hair, and in these tribes it is said to occur in certain families. It was supposed to be more prevalent among the Tuhoe, Maniapoto and Upper Whanganui tribes. Red hair is knovn as *Urukehu*, and was popularly supposed to be another *Patupaiarehe* inheritance. . . .

In the Auckland Museum there is a hank of beautiful wavy red hair, obtained from a rock shelter near Waitakerei. That it belonged to pre-European days is proved by the root ends being plaited together and bound round with fine braid prepared from the same hair. Curiously enough, the only other specimen of hair in the same case is also bound round with fine hair braid and is dark brown in colour. ... As another example of the Maori belief in the inheritance of fair hair from certain ancestors, we have the proverb, 'He aha te uru o to tamaiti? Kapatau he uru korito, he korako, he uru ariki no Pipi.' 'What is the hair of your child? Were it flaxen hair or whitish, it would be the hair of high chieftainship from Pipi.' Pipi was a woman of the highest rank who flourished twenty-four generations ago and was an ancestress of the Ngati-Ira tribe."

In his analysis of "The Blood Groups of the Maori", Phillips (1931) found a sereological pattern of peculiar nature which he attributed to the particular branch of *Uru-kehu* or red-haired Maori ancestry. He says (p. 286): "The Maori immigrated to New Zealand from Hawaii some six hundred years ago to find an aboriginal Maoriri race in possession of the islands. These Maoriri were characterized by their fair skins and a certain reddish tint of their hair. Many were slain by the Maori immigrants and the remainder driven from the fertile districts to the security of more mountainous country. In later generations a considerable Maori-Maoriri miscegenation occurred until now the Maoriri has disappeared as a race, leaving behind individuals who in many cases still carry in their red tinted hair and fairer skins the evidence of their Maoriri forebears. I was led to the conclusion that all the subjects apparently belonging to Group I were in reality the descendants of Maori-Maoriri unions, by the fact that four of them had fair skins and red tinted hair and were acknowledged by other Maori to have been descended from Maoriri stock. This conclusion was strengthened by the fact that all these individuals were members of Te Arawa tribe, which made its home centuries ago in the Rotorua district on the fringes of the Urawera Mountains, into which the Maoriri retreated."

In his monograph on *Polynesian Religion*, Handy (1927, p. 105) pointed to the following interesting fact: "There was a widespread belief in the blondness of one of the superior gods, but strangely enough it is by no means always the same character who is so described. In Hawaii, Kane was believed to be red headed or blond, and was therefore sometimes referred to as 'red Kane'; and in a prayer he is addressed as 'Kane the blond one'. In the Marquesas, the same deity is said to have been 'white' and blond haired, and to have been progenitor of the 'white' foreigners (*hao'e*), in contrast to Atea, the forefather of the native peoples who was brown and darkhaired like them. On Mangaia, it was Tangaroa to whom was attributed blondness, his hair being said to be of a red, sandy color. Hence it was that the natives of this island concluded that Captain Cook's party were the fair-haired sons of Tangaroa. In a song from Niue, which is just south of Samoa, occurs the line, 'red and white art thou, O Tangaroa, precious one from the unseen country'. It is said also that on the same island the god Tu was believed to be an albino. In Tonga, Tangaloa was god of foreigners, but whether he was believed to be blond is unknown to me. The fact that Captain Cook was received as Lono (Rongo) in Hawaii may indicate that this god as well as Kane was here supposed to be light of complexion. Wakea in Hawaii was sometimes spoken of as 'The *ehu*, the blond, the bright, the shining one'. There is much historical significance in this attribution of blondness to certain of the superior gods. It is entirely unnecessary to resort to the theory of sun gods with golden hair to explain it, for the clue to the real significance of these beliefs is to be found in certain racial and cultural facts now well established. Blondness and reddish hair have been known in the case of individuals among the people from traditional times, manifesting itself from time to time apparently in fairly pure blond and light skinned individuals. Concomitant with this physical evidence of the presence of elements of a blond type in the racial makeup of the Polynesians there is the fact that lightness of skin was everywhere in pre-Eorupean times regarded as one of the distinguishing marks of chiefly birth. Bleaching of the skin and sometimes the hair by various artificial means, and avoidance of exposure to the sun were customary with people of rank in all parts of Polynesia. In view of these circumstances, physical and social, it is by no means surprising to discover the concept of blond ancestral gods among this people in whose veins undoubtedly runs the blood of some very ancient Caucasoid progenitors. ... The studies in anthropometry carried on by the Bishop Museum in the past few years have revealed the presence in the Polynesian stock of a substratum of Caucasoid blood with blonde tendencies."

J. M. Brown (1924, p. 236) says: "There are also many indications of a blond race having penetrated into Polynesia. There is the story, in at least all the larger areas in which there were refuges for a defeated people, of a golden or red-haired race that crossing with some of the conquering immigrants have left the Urukehu, or light-haired families, and children. Moorea, the island opposite Papeete, was of old called 'the island of fairy folk with golden hair'. In Hawaii they worshipped Cook as their golden-haired god Lono returned to his original home, and the priest led him with high ceremonial and offerings to the great stone truncated pyramid that was the temple of the god. In New Zealand the Turehu, a light-haired aboriginal race away up in the mountains of the Urewera country, crossed with the immigrants and so left numbers of Urukehu in that region. But it is the Patupaiarehe that are especially referred to as the purest of the blond-haired races; and Mr. James Cowan has shown in the June and September numbers of the Polynesian Society for 1921 that the wise men of the Ngatimaniapoto tribe have traditions of this fair-skinned people having lived in the fatherland Hawaiki."

Cowan (1921, p. 97), after making special inquiries among the Maori concerning their tradition of the Patupaiarehe people, whom they declared to have dwelt in early New Zealand together with the black race-type, writes: "The Patu-paiarehe were for the most part of much lighter complexion than the Maori; their hair was of the dull golden or reddish hue, 'uru-kehu', such as is sometimes seen among the Maoris of today. ... This class of folk-tales no doubt originated in part in the actual existence of numerous tribes of aborigines who dwelt for safety in the more inaccessible parts of these islands [New Zealand] and in the Pacific Islands; and also in the prehistoric contact with a more cultured fair race. This immeasurably ancient light-haired people left a strain of Uru-kehu in most ancient tribes."

Cowan goes on to quote the description of this early culture-people by an old native Maori historian: "They were an Iwi Atua (a god-like race, a people of supernatural powers). In appearence some of them were very much like the Maori people of today; others resembled the Pakeha (or white) race. The complexion of most of them was *kiri puwhero* (reddish skin), and their hair had the red or golden tinge which we call *uru-kehu.* Some had black eyes, some blue like fair-skinned Europeans. They were about the same height as ourselves. Some of their women were very beautiful, very fair in complexion, with shining fair hair. They wore chiefly the flax garment called *pekerangi*, dyed a red colour; they also wore the rough mats *pora* and *pureke*. In disposition they were peaceful; they were not a war-loving, angry people."

We should do the serious Maori historian a great unjustice—and deprive ourselves of valuable information—if we assume that these are fairy-tales and nonsensical concoctions. The Maori tell us calmly that on their own arrival two foreign peoples lived in New Zealand; one they describe clearly and concisely as we would ourselves describe certain known Melanesian types; the other they describe simply as tall, like the Maori themselves, with reddish or white skin, and red or fair hair, "very much like the Maori people" or even resembling the Pakeha or White race.[1] There is nothing incredible in it, inasmuch as the traditionally remembered race concurs with the known *Uru-kehu* type as found and described in New Zealand even by modern literate observers.

The early Norse sagas, including Leiv Eiríksson's voyages of discovery, are accepted as history because they were passed down from father to son through generations of unwritten traditional accounts until set down in writing by mediæval scholars. The sacred history of the Maori is not less trustworthy; to them the skill of memorizing past events had become an art, while tribal history had become religion.

Dixon (1921, p. 82) states that Maori tradition even preserves information concerning the early inhabitants encountered by their forefathers when visiting Raiatea in the Society Group. Some of them were said to have been very dark in colour, with flat and broad noses and short stature, whilst another people on the same island were very light-coloured with fair or reddish hair. There seemed also, according to the old Maori teachings, to be people of evident intermixture between these two extremities. Dixon believes to identify the dark people as being of Melanesian descent, and adds that as to who "the light-haired, light skinned people" were, no solution has yet been reached. He writes further: "This tradition as to a light coloured people dwelling in some of the islands is supported by the records of other tribes... At present this fair people is a mystery."

In his paper on the Moriori of the Chatham Islands, Shand (1894, p. 77) describes this Polynesian tribe as resembling the Maori, but they were less tall and had often "more of a Jewish cast than even that people, their noses often being strongly hooked. ... In a few instances the hair was of a reddish tint (uru kehu), in which also they resemble the Maoris, who gave the same name to that description of hair."

Scott (1893, p. 24) quotes one of the earliest English settlers in the Chatham Islands (F. Hunt) who found the aborigines to include individuals with hooked noses, bearing "a most remarkable resemblance to the Jewish race", others again having quite Melanesian features, with soft and flattened nose.

The historical traditions of the present Chatham Islanders state that their ancestors came from Hawaiki some twenty-seven or twenty-eight generations before 1893 (*Ibid.*). According to Mair (1871) the traditions further record that their own forefathers came in a party of five canoes. Upon arrival they found two people living together on the islands. By intermarriage they all became one people in the end.

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[1] It should be noted that the colour of the European skin is referred to in many parts of Polynesia as 'red' and not as 'white'. The natives are probably observing our rather 'pink' shades which actually are more red than white when Europeans are sun-burned in the tropics.

In the same group the *Uru-kehu* elements seem to be most apparent in the northern districts, and it is chiefly here we may apply Tregear's (1889, p. 75) statement that "the hooked nose sometimes seen on the Maori face, especially in the north, is here very common, and in some cases, exaggerated to portentous dimensions."[1]

In his paper on the Tongareva aborigines, Smith (1890, p. 92) quotes Mr. Lamont who, being one of the first Europeans ever to reside on the island "had opportunities of observing the people in their original savage state". Lamont described the local Polynesians as having "handsome bushy beards, generally black, but sometimes tinged with auburn", whereas: "More than one woman is described as having auburn hair and a fair skin, answering to the *urukehu* or reddish-coloured hair sometimes seen amongst the Maoris."

We have seen that Maori tradition even claims that light-skinned, red-haired people dwelt in Hawaiki; and in the Hawaiian group we actually find, among the present Maori-Polynesian occupants, vestiges of both the two foreign strains in question, the dark and the fair. Stokes (1932, p. 597) has assembled sufficient evidence concerning the light-coloured elements in the Hawaiian population to show that they are certainly not descendants of early Spaniards—as was once suggested—but that this physical type, which the native Hawaiians term *ehu*, are members of the same *uru-kehu* stock which appears all over aboriginal Polynesia. The Hawaiians speak of some of their earliest prehistoric kings as being *ehu*. In a tradition concerning one of the early ancestral wars we are told (Malo 1898, p. 239): "Lihau-ula lost his life, killed by Wakea, the blond one (*ka ehu*), and his kingdom went to Wakea." An ancient prayer to the old Hawaiian god Kane begins (*Ibid.*, p. 180): "O Kane, the blond one, here is an offering of prayer to you,..."

In Mangaia of the Hervey islands, Kane, or Tane, is associated with a mythical race of fair men and women, with white complexion (Gill 1876, pp. 257, 265); and Handy (1923, p. 11) writes from the Marquesas group: "Tane was fair with light hair and is said to have been the ancestor of the white race (the Hao'e); Atea was dark like the natives, who are his descendants. This conception of Tane as a fair god I believe to be genuinely native, since it is in line with many similar mythological concepts of deities with fair hair and fair skins in other groups of Polynesia. Whether or not this indicates contact with individuals or groups of the white race prior to the historic discovery of the Marquesas, one cannot say. ... All that one can say with assurance is that the Marquesas islands, like the rest of the Polynesians, must, at some time prior to the first recorded visits of Europeans, have known of the existence of the white race,... The presence of Caucasian blood in the native physical complex, which is indicated by the descriptions of the early voyagers, and which was brought out also by the anthropological investigations of our expedition, must be born in mind in connection with these considerations. ... Some credence is certainly due also to the statements of natives of the present day, with many of whom I have discussed this subject. All insist that in ancient times, before the arrival of any Europeans, there were many of their people with very light skin and reddish hair."

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[1] Baucke (1928, pp. 17, 357), himself born in the Chathams in 1848, said that the natives in the southern section had a rather flat, depressed nose, extremely wide mouth with thick lips, and close-curly hair, whereas in the north a completely distinct type was visible to the most casual observer. "This northern section of the race differed from the other in the predominating narrow Aztec face; the pinched high-ridged down-curved nose; the less pented eyebrows; the straighter, finer, occasionally lighter hair;..."

Urukehu and Caucasian-like elements seen by the early European discoverers

We have seen that the first Spaniards and thus the first Europeans ever to see a Polynesian island were the members of the Mendaña expedition which discovered the Marquesas Group. On July 28th, 1595, these Spaniards sighted Santa Cristina Island (Tahuata), and from their log (Quiros 1609 b, p. 22) we learn that, on the day after the discovery, Mendaña went ashore with his wife and heard mass said by the Vicar: "A very beautiful native sat near Doña Isabel, with such red hair that Doña Isabel wished to cut off a few locks; but seeing that the native did not like it she desisted, not wishing to make her angry."

The members of this early expedition, who set out from Peru to visit the first islands east of Australia 350 years ago, or about 200 years after the end of the Maori-Polynesian conquest, certainly saw the separate elements of the present island race at a time when each of them was more conspicuous and less interbred than in later years. They stressed the difference in hue among the local Marquesans, and reported that the lightest people occupied Magdalena Island (Fatuhiva). They speak of "white" natives with "most beautiful flowing hair, and many of them very fair". One boy had a face "like that of an angel... not fair but white." (*Ibid.*, p. 16.) And we learn in the same connection about these islanders that: "Many of them were ruddy."

Even on his previous voyage, which had missed Polynesia and sailed straight on into the adjoining sections of Melanesia, Mendaña (1568, p. 133) came across "white" natives among the dark Melanesian aborigines, and recorded an evident racial chaos. Of his visit to Santa Ysabel, in the Solomons, where we today find evidence of ancient Samoan colonies, we read:

"There are Indians of different complexions in this island; some are of the same colour as those of Peru, others are black, and a few are quite fair, these being either they who rarely leave their houses, or young boys. They all curl and dye their hair, and some dye it a light colour; some are naturally fair. The women wear their hair cut short... it is very ruddy [*rubio*]."

We shall see later how some genuine Polynesians, especially in Samoa and Tonga, who are not naturally fair or red-haired, imitate those who are by adding red colour or dye to their hair in veneration for some early red-haired ideal of beauty.

The narratives of the early Mendaña expeditions are full of references to aborigines of three different types mentioned as black, white, and mulattos. Torquemada (1615, p. 438) puts it thus: "...innumerable natives of three different colours: ... Some were yellow, others quite black, and the others remarkably white. They had beards and red hair." (Santa Maria, Banks Group.) Of the light-skinned elements we are told that (*Ibid.*, p. 428) although they had been brought up under the rigorous heat of the sun and were exposed to the air, "yet they were very white, more especially the women, if properly dressed, would have advantages over our Spanish women..." And this is said some 350 years ago about a now extinct or absorbed element, living among the black aborigines on the outskirts of Melanesia facing towards Polynesia.

We learn about a local native chief that (*Ibid.*, p. 421): "He wore on his head a crown of small black feathers, but so fine and soft that they looked like silk. From the back of his head fell a mass of red and rather curly hair, reaching half down the back. This caused great astonishment among our people, to find that among a race which is not white there should be such very red hair, though they believed it to be his wife's, knowing that he was married." Gonzales de Leza (1606, p. 340) describes the same crown: "In the turban which the Chief gave to the Sergeant, among many feathers, there were tresses of a woman's hair arranged like a diadem, which they value among themselves... The hairs were long and very golden, like gold threads, and there could not be any better in our Spain, even if they were dyed."

Gonza es (*Ibid.*, p. 367) says of the chief of Gaua in the Banks Islands: "His colour was that of a Zambo [a cross between Indian and negro], with great beard and long hair, not very curly, and red. There are men in this land of a whiter colour."

About the discovery of Peregrina Island, 1 600 leagues from Lima and on 10°20′ South, we are told (Quiros 1609 a, p. 210): "Five natives came in a canoe, the middle one vigorously bailing the water out of the vessel. His red hair came down to the waist. He was white as regards colour, beautifully shaped, the face aquiline and handsome, rather freckled and rosy, the eyes black and gracious, the forehead and eyebrows good, the nose, mouth, and lips well proportioned... It was pain to the Captain that the youth could not be kept, to take as a proof of the greatness of God in those parts."

When the Spaniards went ashore on this island, they found among the very few treasures in the native houses, fine mats and: "...tresses of very golden hair".

Later the expedition discovered Taumaco Island, five days east of Santa Cruz on the border of Polynesia. Approaching land they saw natives on the beach, some black and some brown, and then they tell us (*Ibid.*, p. 225): "Presently another native came and looked at us with astonishment, and we looked at him with no less care: owing to his colour being so white, and so brown as regards beard and hair, that our people called him 'the Fleming'."

The observations of the Mendaña expedition were later recalled by the early explorer Surville (1769, p. 444), who saw at Simbou Island what he terms a "white lady", arriving in a canoe with "black men", while mourning her husband. He adds himself: 'This incident concurs with the report of the historian of the Mindana expedition, who says that in the Solomon Archipelago one may find black people, mulattos and whites."

A sprinkling of naturally brown hair has been noted among the Melanesians in this very locality—as in Malaita— until present times.

We shall now proceed to the opposite and windward side of Polynesia, to lonely Easter Island, located far from all land, half-way between the South American mainland and the nearest group in Polynesia. On this isolated spot aboriginal life was preserved undisturbed by our own race until the island's existence was detected by the Dutch expedition under Roggeween in 1722, and rediscovered by the Spanish expedition from Peru in 1770. We learn from Roggeween's visit of discovery (Behrens 1737, p. 134) that, as the darkness receded over the island in the early morning, the natives ashore kindled a quantity of fires while prostrating themselves before the rising sun, and then a few of them came on board Roggeween's ship: "One amongst these was an entirely white man, who was wearing white chocks of wood in his ears as large as one's fist, and bore a very devout appearance, so that we took him to be an idol priest." Further (*Ibid.*, p. 136): "As for their complexion they are brownish, about the hue of a Spaniard, yet one finds some among them of a darker shade and others quite white, and no less also a few of a reddish tint as if somewhat severely tanned by the sun."

The subsequent Spanish expedition observed (Agüera 1770, p. 96): "...these islanders being in colour between white, swarthy, and reddish, ...the hair chestnut coloured and limp, some have it black, and others tending to red or a cinnamon tint." Also (Corney 1903, p. xiv): "The men are thickly bearded, tall, well set up, white and ruddy."

Since these early visits amalgamation and disturbances have entirely changed and drastically reduced the original population of Easter Island, but the occurrence of fair skin, and sporadic individuals with red and dark brown hair, were still described by Beechey, Loti, Geiseler, etc. The last visitors to notice any marked trace of the former complexity of the Easter Island race were the members of the Routledge expedition, from whom we learn (1919, p. 221): "Roggewein's description of the people as being of all shades of colour is still accurate. They themselves are very conscious of the variations, and when we were collecting genealogies, they were quite ready to give the colour of even remote relations. (Described as either 'black' or 'white'.)... It is obvious that we are dealing with a mixed race..."

Beyond Easter Island, the dense Tuamotu Group represents the Polynesian facade towards the east. From Reao (Claremont de Tonnère), on the eastern margin of this group, Beechey (1831, p. 147) wrote of the aborigines: "...here also there was among them a great diversity of complexion. In one of the canoes was a man nearly as dark as an African negro, with woolly hair, tied in a knot like the Radackers; and another with a light complexion, sandy hair, and European features." The same voyager wrote about the neighbouring tribes of Vahitahi (Lagoon Island) in the same group: "In complexion they were much lighter than the islanders of Claremont Tonnère: one man, in particular, and the only one who had whiskers, was so fair, and so like an European, that the boat's crew claimed him as a countryman."

We have already quoted the Mendaña expedition concerning the light-skinned and red-haired individuals found among the local aborigines in the third of the eastern outposts of Polynesia, the Marquesas Group. Forster (1777, Vol. II, p. 15) writes of this group also: "...their hair black, curled, and strong; a few excepted, who had light-coloured or sandy hair."

Sullivan (1930 c, p. 8) found in the Marquesas Group one particular physical type which represented "the association of a long head, narrow face, and narrow nose, with light skin, beard and body hair, and tall stature". He also states (1923, p. 161) that "Handy found a fairly high percentage of reddish-brown hair in the Marquesas", and refers to a letter from Handy to this effect:

"You will note that we have frequently marked hair colour both black and reddish-brown. This indicates hair of the type that is almost universal with them, which appears to be black unless one sees it so that the light comes through it, when it is seen to have a strong auburn or reddish-brown tinge. I have never found any evidences of the custom of bleaching hair in the Marquesas neither in modern nor in ancient times—(There was formerly a bleaching of the skin, but this is not practised now.) I am convinced that this russet colour in the hair was indigenous to the Marquesans before the coming of the early explorers."

We have seen from the European discovery of Tahiti in 1767, how the Englishmen were amazed at finding aborigines on that island whose skins were in certain instances whiter than their own, and Robertson (1766—68, p. 179) left us also with the following interesting information: "...there is three distinct colours of people here, which is a thing most difficult to account for of anything which we have yet seen, the Red people are ten times more numerous nor the Mustees, which is a Medium between the Whitest sort and the red or Indian Colour [Mustee is a cross between a white and a threequarters white, i.e. a seven-eights white], and the Mustees are near ten times as numerous as the Whitest sort." The same early visitor (*Ibid.*, p. 228) was much impressed with what he terms the "whitest sort", and he says of them: "...this Race of White people in my opinion has a great resemblance to the Jews, which are scaterd through all the known parts of the Earth."

Subsequent visitors to aboriginal Tahiti in the same early decade speak of individuals among the local natives who had yellowish-brown and sandy hair, and Forster (1778, p. 229) speaks of a native Tahitian who had "perfectly red hair, a fairer complexion than the rest, and was sprinkled all over with freckles".

Shapiro (1930, p. 283), in his modern study of *The Physical Characters of the Society Islanders*, writes: "The hair colour is overwhelmingly black and dark brown. Handy observed a high per cent of reddish brown among the Society Islanders."

The Polynesian veneration for light skin and red hair

Handy and Buck have shown us how the dark element in the aboriginal Polynesian population was regarded with contempt as slaves of the Arii, or peacefully teased by the modern Maori. In contrast, we find that fair skin and red hair were reverenced and admired throughout the same islands. Buck has revealed that the Maoris have on old saying referring to the fair hair on their children as *hair of high chieftainship*. Fair-haired children were held in high esteem throughout Polynesia. We have even seen how they were, in Mangaia, considered direct descendants of the principal ancestral god Tangaroa. Similarly, white skin was the highest Polynesian ideal of beauty, a sign of descent from the best of the ancient lineages and the symbol of chieftainship of pure blood.

Natives who had naturally darker skin and black hair attempted, by bleaching or painting themselves, to approach the ancient ideal of human beauty, as seen on some of the early gods and men of the most sacred ancestral branch. Thus pointing to the native accounts concerning their "white" ancestors, J. M. Brown (1927, p. 184) says: "There can be no mistaking the significance of these legends. Especially when added to the fact that Polynesian children are often bronzy-haired, and that in all the groups there are light-haired families and individuals called kehu we cannot resist the conclusion that there was at least one blond migration into Polynesia. Even in the smaller islands like Rarotonga there are traditions of this. In 1918, when the soldiers were welcomed back from the front, an ancient dance was revived, in which the performers whitewashed themselves in order, they said, to make themselves like their ancestry."

He also says (1924, p. 236): "Even the Gilbert Islands in Micronesia have a legendary land of blond people called Matang to which the spirits of their dead go; and for a year or two before coming out at the great dance (Ruoia) the girls are blanched. So the aristocracy of most Polynesian areas blanched their daughters by keeping them out of the sun. And the Easter Islanders kept a blanching house near some of their dancing places."

In the Pukapuka community, of the Hervey Islands, a sacred maid, *Mayakitanga*, was always chosen from among the chief's relatives to testify to the white hue of the chief's forebears. "She was kept inside her house for two or three months at a stretch, her skin carefully oiled so that it became exceedingly fair. ... Her special function was to act as a prestige symbol for the chief and his lineage." (Beaglehole 1938, p. 237.)

Gill (1876, p. 257) states: "Throughout the eastern Pacific islands 'Tapairu', or 'fairest of the fair', is a favourite name for girls."

Young men of the Tahitian aristocracy aimed at keeping their fair skin as light as possible. "This is done by remaining a month or two in the house; during which time they wear a great quantity of clothes, ..." (Cook 1784, Vol. II, p. 147.)

The Marquesas Islanders claim, like the Easter Islanders, that one branch of their ancestors had white skin, and as Linton (1923, p. 421) shows: "White skin was greatly admired by the Marquesans, and it is mentioned as a beauty feature in some of their legends." They imitated the hue of the fair branch of their ancestry by an ingenious process based on an ointment which actually bleached their tanned skin for a very short while until the sun restored the normal tint. (*Ibid.*) Handy (1923, p. 12) says of this Marquesan custom: "...the custom itself indicates an admiration for light complexion. This admiration is exhibited in many legends, as in that of Tuapu in which the color of the skin of the hero is likened to that of the meat of a coconut."

The Samoan chiefs and aristocracy took great care to preserve the naturally fair skin of their daughters by keeping them indoors, and in Samoa (Turner 1861, p. 206), as in Tonga (Cook 1784, Vol. I, p. 386), Hawaii (*Ibid.*, Vol. II, p. 192), and Easter Island (Stephen-Chauvet 1934, p. 18), although the bulk of the population had naturally black hair, a great number of these imitated those who were naturally *uru-kehu* (*kehu*, *keu*, *'ehu*) or red-haired, by artificially colouring their own hair red.

Cook (1784, Vol. I, p. 386) describes how, in the Tonga Group, most of the men and some of the women went to much trouble to give their black hair a brown, purple, and orange cast, and he observed: "The first colour is produced by applying a sort of plaster of burnt coral, mixed with water; the second, by the raspings of a reddish wood, which is made up with water into a poultice, and laid over the hair; and the third is, I believe, the effect of the *turmeric* root."

A modern theory has been produced to show that lime was merely used to cool the hair in a hot climate, but in view of Cook's description it seems fairly obvious that the principal purpose is to secure the esteemed red colour. Cook and his companions describe brown and fair hair in New Zealand and other Polynesian islands where the dyeing-process was not used (Cook 1777, Vol. I, p. 308; 1784, Vol. I, p. 154); and we find on islands where some natives colour their hair, individuals who have it naturally red. Thus in Samoa, natural reddish-brown hair occurs among those who strive to imitate it, whereas Sullivan, as stated earlier, describes the local hair as "European" both in texture and in form.

Even in Fiji there are individual natives with naturally defrizzed carrot-coloured hair, and others who dye it artificially red, while chief's daughters, as in adjoining Polynesia, "are sometimes confined to the house during the daytime for several years, in order to lighten their complexion ... They are called *Tambu-Singa* (forbidden the sun)." (Amherst and Thomson 1901, p. 133.)

The myth of Tangaroa's fair children

The principal god in Central and Western Polynesia, and an important deity even in New Zealand and Hawaii, is Tangaroa (or Tangaloa, Kanaloa, Taaoa, according to dialect). He appears in Polynesian mythology partly in the shape of a creator, partly as the god of navigators and the ocean, and partly associated with solar myths, or even as the progenitor and god of the early fair race.

We may well examine the religious-historical allegories preserved in some of the Tangaroa myths. St. Johnston (1921, p. 69) writes: "A little way back I told how Tangaroa at Mangaia Island became the father of two fair-haired children by Hina the Beautiful. This story in different forms is constantly reappearing, and I think there is no doubt whatever that the Sun-god, whether he be Tane or Tangaroa, is vaguely associated throughout the Pacific with a half-forgotten race of fair people, who are recognized as the senior or more chiefly branch. ... In Mangaia Island all fair-haired children are said to be 'children of Tangaloa', and in many other islands the same idea prevails."

In New Zealand, where Tangaroa was the god and ruler of the sea, Percy Smith has shown that our own race was named Pakeha by the Maori in memory of "a race of 'gods' called Pakahakeha, who are said always to live on the sea, and are white in complexion..." Naturally, they also would be the children of the ocean god Tangaroa.

The "white and black fraternity" of early Tonga

These Mangaian and Maori conceptions concerning their common god Tangaroa are well worth bearing in mind when we turn to Tonga.

The most interesting and remarkable allegory concerning Tangaroa's activities in early Polynesia is probably that collected by Mariner during his famous early residence among the aborigines of Tonga. (Martin 1817.) Well preserved, as it is, in the shape of a typical religious parable, it might have passed the attention of the European reader if it were preserved anywhere but among the native orators and historians of aboriginal Polynesia. As it is, we may accept it as a Tongan version of an important event in their early times, zealously guarded for recitation on ceremonial occasions. The opening of the legend is familiar in all parts of Polynesia, where the local islands are symbolized either as mighty fishes or as fragments of the rocky ocean bottom, their early discoverer being likened to a great fisherman (*Ibid.*, Vol. II, p. 121):

"One day Tangaloa, the god of arts and inventions, went forth to fish in the great ocean, and having from the sky let down his hook and line into the sea, on a sudden he felt a great resistance: believing that he had cought an immense fish, he exerted his strength, and presently there appeared above the surface several points of rocks, which increased in number and extent the more he drew in his line: the rocky bottom of the ocean, in which it was now evident his hook had caught, was thus fast advancing to the surface, so as to have made one vast continent; when unfortunately the line broke, and the islands of Tonga remain to show the imperfection of Tangaloa's attempt."

"Being now willing that Tonga should also be inhabited by intelligent beings, he commanded his two sons thus: Go, and take with you your wives, and dwell in the world at Tonga: divide the land into two portions, and dwell separately from each other. They departed accordingly. The name of the eldest was Toobó [In present Polynesian spelling *Tu Po*, or 'Divine-Night'], and the name of the youngest was Váca-aco'w-oo'li [*Vaka-akau-uli*, or 'Vessel-of logs-to steer'] who was an exceedingly wise young man; for it was he that first formed axes, and invented beads, and cloth, and looking-glasses. The young man called Toobó acted very differently, being very indolent, sauntering about and sleeping, and envying very much the works of his brother. Tired at length with begging his goods, be bethought himself to kill him, but concealed his wicked intention; he accordingly met his brother walking, and struck him till he was dead. At that time their father came from Bolotoo with exceeding great anger, and asked him. Why have you killed your brother? Could not you work like him? Oh thou wicked one! begone! go with my commands to the family of Vaka-acow-oóli and tell them to come hither. Being accordingly come, Tangaloa straightway ordered them thus: Put your canoes to sea, and sail to the east, to the great land which is there. Be your skin white as your minds, for your minds are pure; you shall be wise, making axes, and all riches whatsoever, and shall have large canoes. I will go myself and commend the wind to blow from your land to Tonga; but they shall not be able to go to you with their bad canoes. Tangaloa then spoke thus to the others: You shall be black, because your minds are bad, and shall be destitute; you shall not be wise in useful things, neither shall you go to the great land of your brothers; how can you go with your bad canoes? But your brothers shall come to Tonga, and trade with you as they please."

The marked antiquity of this allegoric tradition is pointed out by Fornander (1878), who found "references, though more or less distorted, to similar early fratricide in both New Zealand and Hawaiian traditions".

Bearing in mind the belief on other islands that Tangaloa himself was the mythical father specifically of all the light-haired elements among the islanders, analysis reveals some interesting points. Firstly, the divine fisherman who pulled Tonga up from the depths was apparently not recalled as one of the despised dark-skinned stock, but as the principal mythical progenitor of the fair-haired, light-skinned individuals in Polynesia. Secondly, this early ruler was the one who brought, not only his own "white" subordinates, but also their "black" brother to the newly discovered and uninhabited Tonga islands.

The allegory necessarily refers to the earliest epoch of local habitation, and what is more, as a tradition it must have been based on allegoric information gained by the historians of the later arriving Maori-Polynesians, since the present islanders would never consider themselves directly involved in such fratricide, making them reckon their descent from the despised black brother who remained alone with his family on the islands, unable to travel against the wind in his bad canoe.

We need no imagination to recognize in Tu Po the dark, treacherous, and indolent individuals described also in Maori history; nor is it difficult to see that the "white"-skinned, industrious, peaceful, and marine Vaka-akau-uli must belong to the fair-skinned and much esteemed aboriginals of early Polynesia, who are otherwise remembered as "the light-coloured off-spring of Tangaroa", the Uru-kehu, the sea-dwelling Pakehakeha, and the peaceful, intelligent and industrious Patupaiarehe.

The symbolic name Tu Po given to the "black" brother needs no further explanation. We have previously seen how *Tu* (Maori *Ku*) is an affix commonly applied to mythical names, and *Po* means "night" in all Polynesian dialects. His name is merely a reference to the darkness of his skin and his mind.

The name of the seafaring fair brother, Vaka-akau-uli, does not refer to his skin colour, but to his seafaring ability and his special type of craft. Rabone's vocabulary of the Tonga dialect shows that *vaka* is "the general name for all vessels that sail"; *akau* is the "general word for all trees" as well as for "timber"; and finally, *uli* has the meaning "to steer a vessel". It has been suggested (J. M. Brown) that this symbolic name indicated a steersman of some sort, and we may safely assume a description of the vessel's construction is embodied in his name as *vaka-akau*, "sailing vessel of trees or timber". *Akau* can also simply mean "wood" in Polynesia, but nothing would be specified by adding the suffix "wood" to a neolithic craft. Wood was the raw material of any Polynesian boat-building, but true *timber* is employed in no craft but log rafts. We shall see in a later chapter how sail-bearing log rafts played an important part in early Polynesian history and were employed on some islands right up to the time of dicscovery. The name of the fair brother, "Steering sailing vessel of logs", may thus perhaps be taken as equivalent to "Steersman of log-raft".

When translated into plain prose, the essence of Mariner's Tonga tradition seems to be as follows:

Upon the discovery of Tonga by the leader of the light-coloured branch two distinct types of people settled the islands: one was his own kin, the other a foreign race and very dark. The latter were perhaps "older" in the ocean than the others. In disposition, the dark-skinned elements were ignorant, lazy, treacherous, and savage; whereas the light-skinned people were ingenious, industrious, peaceful and cultured. The light-skinned elements were the mariners, the others were not. There was a definite class distinction between the two races; they were not supposed to mix, and dwelt in separate sections of the islands. The dark-coloured population was somehow subject to the fair race, and, envying the works of the latter and being tired at length with begging their goods, they fell upon the fair light-coloured culture-bearers and ended the collaboration with bloodshed, flight and disaster.

In this piece of historical allegory, the Polynesians have attempted to preserve some information pertaining to the racial and cultural relations between the two primary elements in the composite Polynesian stock, described by modern anthropology as the light-coloured Caucasian-like element and the dark-coloured Melanesian-like element. At this early date the now dominant Maori-Polynesian element could not yet have begun its immigration via Hawaiki.

The Manahune remembered as labourers

Haddon (1924, p. 123) says about the early population of Polynesia that it "had a strong Melanesian strain ... This strain may be due not to a migration of pure Papuans, but to one of Melanesians, or possibly of Melanesians with a light-skinned ruling class."

This brings us back to the supposition that Melanesian elements were simply carried as labourers into some parts of Polynesia where they were needed either, as some traditions state, to paddle the craft of the light-coloured chiefs, or, as we learn from other legends, to work on the megalithic constructions attributed to this early era. Let it be repeated that this theory is essentially supported by tradition, and is strongly disputed by many physical anthropologists of our day. It seems quite apparent that former Melanesian elements in prehistoric Polynesia must either have gradually become extinct, as indicated in several traditions, or else they must have entered into the composition of the present Maori-Polynesian stock in very limited numbers.[1]

Churchill (1912) says: "Utterly beyond our comprehension, since apparently so utterly beyond the present capacity of the islanders, the enduring memorials of workers in cyclopean stone are preserved in the South Sea."

In New Zealand, where no such cyclopean stone-works remain, Maori traditions are silent on the achievements and work of the Manahune, and only tell us that when the Maori arrived they were carefully instructed in the arts and rites of the venerated Patupaiarehe, the fair aborigines whom they directly admit to have been "more advanced in culture" even than their own forefathers. (Cowan 1921, p. 97.)

In Hawaii, however, where most impressive fish-ponds, temple platforms and aqueducts remain for posterity from the earliest island era, we learn from tradition that the Menehune did the actual labour. Thus, in his *Archaeology of Kauai*, Bennett (1931, pp. 22, 110) describes the huge and extensive irrigation works by which water was drawn far away from its natural course, and says: "The noted Menehune ditch is the acme of stone-faced ditches. The problem was that of carrying the water, at a high level, around the corner of a jutting cliff. An added difficulty was the necessity of placing the base of the causeway in the river itself where it was constantly in danger of being washed away by a freshet. It is the Menehune ditch alone that has any record preserved of its construction—and that is a myth."

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[1] The possibility that Polynesians sent expeditions into Melanesia in the early island era is also indicated by Melanesian myths. In many parts of eastern Papua-Melanesia there are legendary memories of visits by light-coloured navigators prior to the coming of Europeans. Referring to the "fair-haired children of Tangaloa" in Polynesian race and mythology, Capell (1938, p. 62) writes: "White men, when first seen in Mangaia, were considered to be the offspring of Tangaloa. In southern Malekula [of the New Hebrides] there is belief in a white or at least fair race called the Hambat, Ambat, Kabat, in different places, and white men were similarly connected with them by the people of S. W. Malekula. The correspondence is too strong to resist. These Hambat, however, are culture heroes who visited Malekula and departed again, which seems to be exactly what the Polynesians of the Tangaroa-cult must have done. They stayed longer in the islands to the north-east of Malekula, where they left traces both in language and in myth." Recently a most exhaustive study of these same Melanesian myths and associated problems has been presented by Riesenfeld (1950 b; see also 1950 a). The author shows, with numerous references, that the Melanesians believe that in the past they were visited by industrious and culturally advanced individuals with light skin and occasionally fair or reddish hair, who were engaged in agriculture and above all in organized great-stone work. Riesenfeld identifies these early neolithic visitors as the Caucasoid element which took part in the forming of the present Polynesian race, and he postulates the theory they might have come from some part of Micronesia *en route* to Polynesia. At the same time his own dating of these visits, partly based on genealogy, shows that the period under consideration must have been 800 A.D. at the very earliest, and usually much more recent. (1950 b, pp. 164, 683, etc.) This, as will be seen from the sequel, is too recent to indicate that the Caucasoid visitors were on their way to peopling Polynesia, and we are inclined to support the general opinion that the legends under consideration refer to visits by neighbouring Polynesians from Samoa or Tonga. The unfortunate reception given in certain quarters to Riesenfeld's important survey seems most unjustified. The author's own hypothesis and some of his conclusions may be open to discussion, but he has accumulated masses of interesting material which it would be very unwise to neglect.

According to this myth, an early Polynesian landowner had himself decided upon the location of the dam and the course of the causeway round the cliff and down to his own lands, and the Menehune did the labour. They were organized and divided for the work, "some to gather stones and others to cut them". The Polynesian employer did no manual labour himself, but provided food for the Menehunes, consisting of river-shrimp (*opae*), which was the only food he had in sufficient quantity for the great numbers of labourers.

We learn from Thrum (1920, p. 70) that the Menehune themselves were neither seafarers nor fishermen, but that they were trained in stone-working, and that their dwelling place was in the mountains, their houses were of banana leaves, and they subsisted on bananas, silver-sides and shrimps. "... their conversation was a kind of a murmur like the growl of a dog; they were loud-voiced in their laughter, and were in perfect accord in all their undertakings and manner of living." The same author (1907, p. 116) points out a number of specific *heiaus* or temple terraces of stone which the present Polynesians in Hawaii claim to be the work of the early Menehunes.

Correspondingly, Mc Allister (1933, p. 186), in his *Archaeology of Oahu*, states that the immense temple platform of Ulupo is credited by the present Polynesians to the labour of the Menehune. The huge mass of stone, now thoroughly shattered by treasure-hunters, still has an open terrace 140 feet in width and 30 feet high. The paved pathway to this prehistoric temple is referred to by the present occupants of the island as the "Menehune pathway".

Percy Smith (1910 a, p. 140) tells us that in early Hawaii the Menehune were supposed to have been quite numerous and lived in a state of subjection to the ancient ruling people in the islands, and performed for them many tasks that required great numbers of labourers to complete them at once. Quoting Rice's collection of Hawaiian Menehune-traditions, J. M. Brown (1927, Vol. II, p. 29) states that this early people was not supposed to possess any supernatural powers, but accomplished its great tasks solely by manual labour and great numbers. "All the paths and roads up the difficult cliffs of Kauai were built by them. Many of the great stone temples of the island were raised by them, bringing the stones from a distance; they formed two lines and passed the stones from man to man. ... They built the cyclopean walls of fish-ponds and many of the great-stone aqueducts. It looks as if they had some connection with the megalithic migration into Polynesia, perhaps the natives trained by the conquering warriors in the great-stone age to cut and shape and place the stones. They always worked under orders, and were organized by their king or leader; and it was this organization that achieved such marvellous results ..."

Handy (1930 b, p. 94) thus describes the Manahune of Tahiti: "They were the 'jungle-dwellers', the wood-cutters, planters, eaters of fresh-water fish, and the despised menials of the lords and gentry." Yet he states: "It is interesting that it is in the interior of Tahiti, where the Manahune folk lived, that the expeditions of the Bishop Museum have discovered the most solidly built stonework."

In the Marquesas Group, the present Polynesians are typical wood-carvers and carpenters, and marvel as much as foreign visitors at the huge stone monuments and colossal stone platforms left in their midst. They make small stone and wooden copies of the larger monoliths and declare that the huge statues had been erected prior to their own arrival, by the earlier inhabitants, who fled to fortify themselves in the hills upon the invasion of the islands by the ancestors of the bulk of the present Marquesan stock.

Corresponding native tradition is met with in most Polynesian islands or groups where megalithic ruins are left among the present aborigines, and they are even repeated where similar constructions occur in Micronesia. Thus Christian (1899, p. 108) wrote from his visit to the Carolines: "The stone buildings of Nanmatal were erected by a race preceding the present inhabitants of Ponape." Also: "The builders of Nanmatal belonged to the black race and the Ponapeans are a mixed race." Mentioning the local memories of the Chokalai, Kichin-Aramach or Little Folk, he writes: "These, according to Ponapean tradition, were the little dwarfish folk who dwelt in the land before the coming of the Kona and Li-ot, the giants and the cannibals. ... The speech of the dwarfs, it is said, was a chattering and a gibber as that of bats. They were dark of skin and flat-nosed (*Timpak*). They are believed still to haunt the dark recesses of the forest, and to be very malignant and revengeful." Certain of the present natives, Christian states, are claimed to be descendants of these earlier people, and "they are shorter in stature, and the skins darker than their neighbours; their noses are flat".

Linton (1926, p. 108) says: "The Ponapeans had traditions of a race of dwarf, black aborigines who used the bow in war." This recalls the Marquesan description of the black men in the Tuamotus fighting with bow and arrows, truly a Melanesian custom in the Pacific.

The double epoch of Easter Island

The most impressive remains of the early stone-shaping art in the Pacific are undoubtedly the giant monoliths on Easter Island, at the eastern gateway to Polynesia. (See Plates XXXVII–XL, XLVIII, IL, XC.)

Here too the present Polynesian inhabitants are unable to account for the vast stone constructions, which they merely say must have been built and transported to their present sites by supernatural power. (Routledge 1919, pp. 182, 198.) No active megalithic work of any description has been witnessed on Easter Island in historic time in spite of the loose theories to this effect, and none of the island historians have furnished the slightest information on the origin, technique, and working period of the enormous images, which, one would imagine, should have left some impression in the traditions of a historical-minded and ancestral-worshipping tribe on a small island where there is little else that is impressive. After all, these stone giants have been enough to impress the whole outside world.

The fact that neither the early European voyagers nor the present island population have been able to leave us with written or oral information about their construction does not prevent us from deducing at least some dependable information from observations in the field. A survey of the old image-quarry, which is found inside the extinct Rano Raraku crater (Thomson 1889; Routledge 1919; Etc.), shows that considerable works went on there until to the very moment operations totally ceased. In other words, the activities in the sculptors' mountain workshop did not continue through the ages until they gradually petered out; they must have ceased rather abruptly, because a number of statues were abandoned partly finished and representing all stages of progress.

As shown by Metraux (1940), the bulk of the numerous statues still left in the quarries, more than 150 in number, were not destined to be removed from their present site in the crater wall, and others had been abandoned unfinished simply because some flaw or other faults had been discovered in the stone. Yet there is enough evidence left that large scale activity in the image quarry ceased all at once, never to be resumed. In some cases the carving from the solid crater wall had just begun with obvious success; in other instances the giant image was quite finished, but for a narrow keel that still attached the back of the figure to the rocky floor of the quarry. In one case a statue was even ready to be launched, and movement was only prevented by blocking the back up with stone wedges, while Routledge (1919, p. 179) writes: "In one instance the moving has evidently begun, the image having been shifted out of the straight. In another very interesting case the work has been abandoned when the statue was in the middle of descent; it has been carved in a horizontal position in the highest part of the quarry, where its empty niche is visible, it has then been slewed round and was being launched, base forward, across some empty niches at a lower level."

The Routledge expedition even discovered that certain giant statues among the great number already erected had later been deliberately overthrown by removing small stones and excavating the earth from beneath the bed-plates. (*Ibid.*, p. 173.) This profanation would never have been carried out, at any period, by the superstitious and ancestor-worshipping Polynesians had the statues originally been erected by their own tribal ancestors.[1] Any images carved by or representing their own sacred forefathers were in Polynesia protected by the highest *tapu* which would in no case be violated, although the destruction of *enemy* sanctuaries was indeed approved by both gods and men.

The sudden interruption of the megalithic work in the image quarry indicates the probability of a prehistoric invasion with tribal warfare on the island. Easter Island tradition is also very specific about such an early local war, which took place between their own ancestors and a legendary people referred to as the "long-ears", because they had the same extended earlobes as those seen on the statues. The adult men among the long-eared aborigines are said to have fled to fortify themselves on the extreme eastern headland, where finally they were all massacred in a ditch. Routledge (*Ibid.*, p. 300) emphasizes that, according to Easter Island tradition, "the strife between the Long and Short Ears is always placed in very remote ages", whereas Thomson (1889), who collected the legends at a considerably earlier date, when they were less distorted, could even write: "The 'long-ears' appear to have been in power in the land at an early period in the history of the islands, though they were eventually defeated and exterminated by the others." Buck (1938 a, p. 228) comments: "The Long-ears lived on the eastern end of the island and were credited with making the stone images which have long ears and the stone temple structures. The Short-ears lived on the western part of the island and had the more fertile lands. . . .

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[1] The profanation of and disrespect for local statues have been seen until modern times. Several statues must have been wilfully overthrown by the natives after they were first observed by the Roggeween expedition in 1722; and Routledge (1919, p. 271) observed how the Easter Islanders themselves cut fragments from the statues near their village to sell to foreign visitors as curios.

Conflict arose because the Short-ears refused to carry stones to assist the Long-ears in erecting a temple. In the war which followed, the Long-ears were said to be almost exterminated. This may account for what appears to have been a sudden cessation of work in the image quarry and the commencement of knocking down the images from their platforms."

It is only reasonable to suspect, in this remembrance of the early "long-ears", a reference to the tribe which had carved the statues, and thus to associate their final defeat and extermination with the interruption of the activity in the image quarry. This would explain, not only why the descendants of the victors in this early Easter Island battle possessed no memories of the monolith-making to pass on to coming generations, but it would also explain why all the statues possess long ears.

Easter Island's traditional history relates that the island was first discovered fifty-seven generations ago by Hotu-Matua and his followers, who came to the island from the east by steering for the setting sun. (Thomson 1889, pp. 526—533.) About twenty generations or more later the island was rediscovered and conquered by new invaders, this time from the west. We shall see that this break in the early Easter Island line, with the overthrow of the long-ears, took place in the beginning of the present millennium as part of the Maori-Polynesian expansion and conquest throughout the Polynesian area.

Two islands nearer to nuclear Polynesia possess traditions indicating that their occupants had sent out a successful expedition resulting in the Maori-Polynesian conquest of Easter Island. The one is Mangareva, the other Rapaiti.

"It is noteworthy," says Mrs. Routledge (1919, p. 294) in support of Easter Island tradition, "that a legend exists elsewhere which definitely reports that the later comers did find an earlier people in possession. According to the account of Admiral T. de Lapelin, there is a tradition at Mangarewa in the Gambier Islands to the effect that the adherents of a certain chief, being vanquished, sought safety in flight; they departed with a west wind in two big canoes, taking with them women, children, and all sorts of provisions. The party was never seen again, save for one man who subsequently returned to Mangarewa. From him it was learned that the fugitives had found an island in the middle of the seas, and disembarked in a little bay surrounded by mountains; where, finding traces of inhabitants, they had made fortifications of stone on one of the heights. A few days later they were attacked by a horde of natives armed with spears, but succeeded in defeating them. The victors then pitilessly massacred their opponents throughout the island, sparing only the women and children."

Although the identity of this traditional island so frequently referred to in Mangareva tradition has been disputed, there was no inhabited mountain island east of Mangareva save Pitcairn and Easter Island.

Couteaud (1910, p. 90) found a similar tradition among the inhabitants of Rapa-iti, claiming that an early chief on this island went from Rapa-iti (Little Rapa) to Rapa-nui (Great-Rapa or Easter Island) with three canoes, and on arriving there he and his followers subjugated a people with "large ears". St. Johnston (1921, p. 103) may have found the true reason for this departure of the three canoes from Rapa-iti: he observes that Tangiia, an ancestor of the Rarotongans, visited Rapa-iti twenty-two generations ago, "with no doubt the inevitable fighting that all such 'visits' resulted in," and that, also, "about twenty-two generations ago a King of Rapa-iti was driven out and fled to Rapa-nui (Easter Island) where he and his men killed off the 'long-eared' people, except the women and children."

The statements that Tangiia, according to Rarotonga history, "visited" Rapa-iti about twenty-two generations ago, and that a local chief on that island, according to Rapa-iti history, was driven out and conquered Easter Island, also about twenty-two generations ago, become the more interesting when we note that the Easter Islanders claim their youngest local line to be twenty-three generations old. With such an approximate time measurer as a generation, this correspondence is close enough to be noteworthy.

Percy Smith (1910 a, p. 40) states: "Easter Island's lines go back for *twenty-three* generations by one line, *twenty-seven* by another, and appear to be all local, i.e., have lived on that island. Thompson gives the number as *fifty-seven* from Hotu-Matua, who came there 'from the east' with his large canoes ... This 'coming from the east' is another mystery of this celebrated island..."

We will return later to the Easter Island accounts of Hotu Matua and his arrival with "long-ears" in his party, but may here observe that the *fifty-seven* generations counted back from Thomson's visit to Easter Island at the end of the last century take us back to the very commencement of the first island era, about 450 A. D. For comparison, it is interesting to note with Fornander (1878, Vol. I, p. 166) that the most reliable Hawaiian line[1] numbers *fifty-six* generations from the time the ancestor man-god Wakea discovered the Pacific islands, but that thirteen generations had passed before his descendant, Nanaulu, had discovered and settled Hawaii. These first thirteen generations, from the fifty-sixth to the fourty-third represent names of kings which the Hawaiians appear to have shared, "partially if not wholly, with the Marquesan and Tahitian branches of the Polynesian family..." Fourty-three generations before Fornander's time would take us back to approximately A. D. 800 as the date when the earliest immigrants settled Hawaii. This is remarkable, as it dovetails completely with Emory's purely archaeological dating based on modern radio-carbon analysis. (See Part I.)

As Fornander (1878) collected the Hawaiian genealogies in the same decades as Thomson (1889) collected the Easter Island genealogies, it is remarkable that the former narrated fifty-six and the latter fifty-seven generations since Wakea and Hotu Matua established their respective hegemonies on the Southeastern Polynesian islands. As we shall see, both these original lines were subsequently interrupted by the newcomers, this time first in Hawaii, and, a few generations later, also on Easter Island.

There is neither archaeological nor genealogical evidence to indicate that western Polynesia, e.g. Samoa and Tonga, was permanently settled until many centuries later than 400 or 500 A.D. According to the local genealogies, *western* Samoa was peopled less than forty generations ago, or about 1000 A.D., when a royal progenitor named Pili arrived as the first ruler of Upolu. At that time *Eastern* Samoa had already been discovered and settled by Pili's near ancestors. (Buck 1938 a, pp. 287, 288.) The neighbouring Tongans claim that their islands were first settled when Ahoeitu arrived to establish the first local dynasty, which must have been about the same time as when Samoa was first settled, since thirty-five generations were counted up to Laufilitoga in 1865. (*Ibid.*, p. 292.) In Rarotonga, which is much further *east*, in the central part of Polynesia, the local genealogies begin with a king named Tai-te-ariki, and count forty-four generations up to Upokotakau, or Pa, in the year 1851. This takes us back to the neighbourhood of 800 A.D. Other and secondary royal lines were established on the same island, as throughout the rest of Polynesia, at the Maori-Polynesian arrival and associated migratory vortex in the early centuries of present millennium. (Tregear and Smith 1892, pp. 20, 21.)

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[1] The *Haloa* or *Hoohokukalani-Nanaulu-Maweke* line.

The natives' own oral version of their earliest local history, summarized, is this: The first local dynasties, and thus the first organized settlements, were established in Samoa and Tonga, in western Polynesia, as recently as about 900—1000 A.D. About a century or two before that time, or around 800 A.D., the first dynasty had been established in Rarotonga, in Central Polynesia, the island which shares its longitude with Hawaii. Hawaii was also settled by its first occupants about 800 A.D. Prior to this time the legendary heroes specified in the most ancient Hawaiian genealogy must be sought elsewhere, as they are not local to that particular group. The background of these earliest rulers in Hawaii is exceedingly vague, except for the fact that about thirteen earlier names in the same genealogy are more or less identifiable with the earliest rulers in the Marquesas and Tahiti. Probably, then, about fifty-six generations before Fornander's time, the common ancestors of the Hawaiians, Tahitians, and Marquesans entered the Pacific island-world from abroad. At that very time (or strictly speaking a generation earlier) Easter Island was settled and began its local genealogy with Hotu Matua.[1] In this initial era Easter Island had been discovered by a party of long-ears, or at least including long-ears, which came from the east, from the direction of South America, about the fifth century A.D.

Only the subsequent invaders, who subjugated the long-ears and founded the lasting Polynesian lines on Easter Island, arrived to this island from the west, from the nearest edge of nuclear Polynesia. But they did not reach Easter Island until about the middle of the thirteenth or fourteenth century, according to which of the local lines we follow.

It is remarkable that the Easter Islanders, at the lonely eastern extremity of all inhabited Polynesia, give a date for their original occupation of Easter Island which concurs with the opening of the first migratory era in Polynesia, and, at the same time, declare that this original invasion came from the east. This would naturally imply that the island was the entrance for immigrants into early Polynesia rather than its back wall. The second immigration, however, which brought Hawaiki-Polynesians to Easter Island from the other islands a little more than twenty generations ago, did *not* occur at the opening of that secondary migratory era, since we shall soon see how Hawaii and some parts of Central Polynesia had been swept by this Hawaiki migratory wave a few generations before, or roughly thirty generations ago, all counted, as usual, from the end of the last century.

It is very possible that most of Polynesia, and even part of adjoining Melanesia, were explored shortly after the first establishment of permanent colonies on Polynesian soil, but in spite of the rapid increase of a Polynesian tribe—where each family occasionally had ten children and a correspondingly increasing number of grand-children—generations would still pass before the colonists had spread themselves enough to establish various kingdoms all over the formerly uninhabited Polynesian archipelagoes.

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[1] *Hotu Matua* ("Hill-Parent") and the pan-Polynesian *Akea* ("Light") are hardly to be considered as strictly personal names, but probably more as allegoric terms fit and intended for very sacred aboriginal kings of outstanding importance in the opening of the local history and genealogy.

The genealogical dating of the break in Polynesian dynasties

If, as Easter Island traditions say, their first local era opened with discoverers coming from the east, and the second with conquerors coming from the west, we see that Easter Island represents the nearest accessible Polynesian land to the original eastern discoverers, reached by them with—instead of against—the wind and current. But to the subsequent conquerors from Rapa-iti or Mangareva, Easter Island would be an extremely out-of-the-way place. However, if the first immigrants can be shown actually to have come from the east, and to have pushed on from Easter Island to Mangareva, Rapa-iti or other islands to the west, then the invading Maori-Polynesians from Hawaiki could upon arrival have benefited by the local knowledge of the whereabouts of Easter Island.

We have seen that what appears to have been a seafaring Caucasian-like population, possibly importing some darker, subjugated labourers, had occupied various sections of the oceanic island world, singly or in combination, until the arrival of a third and Yellow-brown race by way of Hawaiki. There seem to have been amalgamations, as well as tribal disturbances and expulsions, already in the early island era, more of which followed as a result of the migratory vortex from Hawaiki at the opening of the present millennium.

Buck (1933) says of this final change of power inside Polynesia: "Traditional narratives state that an early people were found in Hawaii, Cook Islands, and New Zealand by the later Polynesians... The later immigrants conquered their predecessors, who were not exterminated but absorbed." Also (1932 b, p. 63): "Even the organized expeditions to Hawaii and New Zealand found a people already in occupation, with a history that has come down in an unsatisfactory and mutilated form. The later explorers have always belittled their predecessors and purposely robbed them of much credit by obscuring the earlier narratives and even incorporating some elements from these into their own."

About this era of conquest and exploration, which commenced in Hawaii about thirty generations ago, Fornander (1878) wrote: "...after a period of comparative quiet and obscurity, the Polynesian folklore in all the principal groups becomes replete with the legends and songs of remarkable men, of bold expeditions, stirring adventures, and voyages undertaken to far-off lands. An era of national unrest and a tribal commotion seems to have set in, from causes not known, nor mentioned in the legends." Further: "Be the cause what it may, a migratory wave swept the island world of the Pacific, embracing in its vortex all the principal groups, and probably all the smaller. Chiefs from Southern groups visited the Hawaiian group, and chiefs from the latter visited the former, accompanied by their relatives, priests and retainers." And: "To the Hawaiian people it was an era of activity and enterprise, and awakening from a sleep of fifteen generations." "Its traces were deep and indelible. It modified the ancient customs, creed and polity. It even affected the speech of the people."

New names replaced old ones for places and landmarks; new tutelar gods succeeded old deities; and, says Fornander, the construction of pyramidal stone platforms seems to have ceased during this period.

Of the extensive genealogies at Tahiti, the same author states that only the last thirty are definite: "Those thirty generations," he writes ,"bring us up to that period of tribal commotion of which I am now treating, when the aristocracy in almost all the groups took so to say, a new departure." He shows that there were "twenty-four generations of chiefs on Raiatea and Bora-bora, from Raa, the progenitor, to 1863." Similarly: "In the Hervey group, at Rarotonga, the chief, Makea, reckoned himself as the twenty-ninth descendant from the time when the two united expeditions from Samoa and Tahiti, under the leadership of Karika and Tangiia, arrived and established themselves by subjugating the previous inhabitants." Further: "The Marquesan chiefs of Hivaoa, after counting one hundred and forty eight generations from the beginning of things, commence a new series from Matapa, and count twenty-one generations to the present time."

The early part of Marquesan history and genealogy is expressly stated to extend into ancient periods including lists of chiefs ruling before the departure into the Pacific.

On Pukapuka in the Cook islands (not to be confused with the island of the same name in the eastern Tuamotus), as in the Marquesas, twenty-one generations are counted from the establishment of the local line up to the beginning of the present century. (Beaglehole 1938, p. 377.) The Raroia and Takume islanders of the Tuamotu group count twenty-eight generations back from the beginning of present century to the time of the ancestral immigration from other islands. (Danielsson 1951, p. 106.) The oldest genealogy of Fakahina in the same group goes back twenty-two generations from 1900. (Audran 1927, p. 232.) The present Maori tribes in widely scattered parts of New Zealand, as mentioned earlier, count from twenty-two to twenty-three generations back to the arrival of the great Maori fleet from Hawaiki. (Buck 1926 a, p. 184.) Toi, however, pursuing the drift-voyage of his grandson Whatonga, had discovered the Chatham Islands and thence New Zealand on his voyage from Hawaiki some twenty-eight or thirty generations ago. (Best 1925 a, p. 275.) The Chatham Islanders count twenty-seven or twenty-eight generations back to the time when their ancestors came from Hawaiki and conquered the former occupants. (Scott 1893, p. 23.) The mixed Polynesian occupants of the Ellice group in eastern Micronesia state that their island was peopled from Samoa about twenty-seven generations ago. (St. Johnston 1921, p. 125.)

We have already seen that the Easter Islanders claim their two recent lines to have overlapped the former line from the east, one twenty-seven and the other twenty-three generations ago; also that the natives on Rapa-iti count twenty-two of their generations back to the time their king fled to Rapa-nui on the arrival of Tangiia from Rarotonga.

The Mangarevans, dwelling, like the Easter Islanders, in the far east of Polynesia, count 22 generations along one of their lines and 23 along the other back to the time when their two royal families were overthrown by invading Maori-Polynesians from Hawaiki, who reached this eastern outpost from the west. The native version concerning the tragedy that befell the original royal line on their island runs thus: "This was in the period of Takimarama. Who conducted his funeral ceremony? The people who came repeatedly from the west, from Hawaiki, and thus the rule of the nobles passed to the commoners." The same traditions say that the defeated nobles, who had ruled the island up to the time of invasion from Hawaiki, had discovered Mangareva through a landfall by their first progenitors Miru and Moa on the *eastern* coast, at Rikitea. (See A on Mangareva map in part VIII.) These people, who had no connection with Hawaiki, were the original discoverers, since we learn of their arrival: "When Miru and Moa arrived there, this place had no people. Also there were no tall trees from the beach to the foot of the mountain. Bare stood the land." (Buck 1938 b, pp. 20, 23.)

Thus, at the two eastern extremities of Polynesia, Easter Island and Mangareva, we find indications of a primeval landing from the east, with the establishment of a senior line of rulers, followed later by the arrival from the opposite side, from Polynesia proper, of warlike conquerors. The latter were the savage warriors of Hawaiki who massacred the adult long-eared men and interrupted the stone-working on Easter Island, and who "conducted the funeral ceremonies" of Takimarama, the last of the venerated nobles on Mangareva.

With Hawaii as the Maori-Polynesian Hawaiki and the gateway to the island world of the Yellow-brown race, we may well understand that these newcomers spread quickly with the northeasterly trade wind further down to Central, Southern and Western Polynesia, and subsequently, with the benefit of local informants and personal experience, east to the Marquesas, the Tuamotus, Mangareva, and Easter Island. All this is in accord with the respective antiquities of the local genealogies, counted from the establishment of the present Polynesian lines.

Easter Island first discovered by refugees from the east steering for setting sun

Easter Island and Hawaii have one thing in common. To voyagers arriving from the New World they would be the very nearest Polynesian lands, and, in addition, accessible with fair wind and current; whereas to the Malays or continental Asiatics they would both be further removed and harder to discover than any other speck of land in inhabited Oceania. In spite of this remarkable geographical position, Easter Island and Hawaii prove to have one additional peculiarity in common. Each is inhabited by aborigines who have preserved traditions claiming their island to be the first one lighted upon by voyagers from some habitat outside the Pacific, whereas the Maoris and other Polynesians all claim descent from, or arrival by way of, some stepping-stone among the rest of the Polynesien islands.

It is in view of these unusual facts that we ought to reconsider Thomson's early report on Easter Island's historical traditions, collected by him in the late decades of the last century, before the true traditions of these islanders had been wholly distorted, confused, and neglected:

Thomson (1889, pp. 526-533) writes: "*Tradition in regard to the origin of the islanders.* The island was discovered by King Hotu-Matua, who came from the land of the rising sun... The tradition here goes back before the advent of the people on the island, and states that Hotu-Matua and his followers came from a group of islands lying towards the rising sun, and the name of the land was *Marae-toe-hau*, the literal meaning of which is 'the burial place'. In this land, the climate was so intensely hot that the people sometimes died from the effects of the heat, and at certain seasons plants and growing things were scorched and shrivelled up by the burning sun." Further: "Hotu-Matua, driven from his kingdom to the eastward by the rebellion of his subjects, landed with a chosen band of followers on Easter Island, in the month of August (*Anekena*), in two canoes, each 15 fathoms long and 1 fathom deep."

The long and detailed tradition includes a drama of jealousy in Hotu-Matua's original homeland, which caused Hotu-Matua and his brother Machaa to depart from home, on the same course, but independent of each other. About Machaa, the tradition says (*Ibid.*):

"The great spirit 'Meke-meke' is supposed to have appeared to him and made it known that a large uninhabited island could be found by steering towards the setting sun. The land was sighted after they had been out two months, and the canoe was beached on the south side of the island."

Two months later, Hotu Matua and his followers arrived, three hundred in number. Their first landing was made on the islet of Motu Nui, on the north coast, and there they prepared the first cooked food for one hundred and twenty days. These early travelling parties are expressly stated to have found the island uninhabited. They brought with them sweet potatoes and other roots and fruits, and the seeds of various plants, and their first enterprise was to start the planting of whatever they had brought with them. For the first three months they subsisted entirely upon fish, turtle, and the nuts of a creeping-plant found growing along the ground, until their own crops started to yield. The tradition has all the sensible details of a zealously guarded piece of tribal history rather than an allegorical myth.

Thomson (*Ibid.*) comments: "The discovery of the island by Hotu Matua and his band of three hundred, together with the landing already referred to, is probably correct and seems natural enough down to the division of the land and the death of the first king. The wars and causes that led to the migration of the people from the unknown land, called Marae-toe-hau, are no doubt based upon a foundation of facts. There is no good reason for doubting the description of the climate of their former home, which would, if accepted, locate it somewhere about the equator, or at all events in the tropics. The heat could not be the effect of volcanic action, or their legends would not state that the crops were burned up by the sun at certain seasons. The improbable, not to say impossible, part of the story comes in, where Machaa steals away and lands upon the same island which his brother's party reached two months later, by simply steering towards the setting sun."

It would indeed be difficult, but not impossible, for two travelling parties to discover the same island if they set out from *the same place* with *the same course* and in *the same season*, all of which would give them the same main and average course of the trade wind and the current. After all, the choice of the right season was part of the usual procedure when a Polynesian travelling party wanted to repeat a former voyage from one island to another. If the tradition is to be taken as a reference to one single and coherent event, as it is presented, Hotu Matua's party took 120 days on the journey and discovered Easter Island 60 days after Machaa's party, which had taken 60 days in all. This would imply that they started simultaneously or very close behind each other, Hotu Matuas party perhaps losing track of Machaa and combing the ocean (like Toi's search-party when looking for Whatonga), until they sighted the rising clouds over the hills of Easter Island.

There is, however, another point which justifies Thomson's view that two separate events might have amalgamated into this early tradition. These immigrants are said to have brought with them in their craft not only items like sweet potatoes and tobacco, which have their prehistoric home in the New World, but also bananas and sugar-canes, which must have been brought from Rapa-iti or Mangareva. Of course, it is possible that the composite Easter Island history does not remember or specify the respective sources of the early cultivated plants, and includes all of these in the cargo brought by Hotu Matua and Machaa.

Thomson shows that the present Easter Islanders unquestionably are of the current Polynesian type, but adds that they need not be pure descendants from Hotu Matua's early branch. The local traditions claim that Hotu-Matua had "long-eared" men in his party when he came from the scorched land to the east, and Thomson shows that the "long-ears" appear to have been in general power at an early period in the history of Easter Island but they were eventually defeated and exterminated by the others.

Without suspecting a fault in the current theories of a general Polynesian descent from Malays in the west, Thomson (*Ibid.*) admits: "It is difficult to account for the statement, so frequently repeated throughout the legends, that Hotu Matua came from the eastward and discovered the land by steering towards the setting sun, because the chart shows no islands in that direction which would answer the description of 'Marae-toe-hau'."

Easter Island tradition points to Peru

There is no inhabitable shore east of Easter Islands except the coast of South America, as the nearby Sala y Gomez consists of barren and uninhabitable rocks jutting out of the sea. A voyage in aboriginal South American craft from Peru to Easter Island, beginning like the voyage of Hotu Matua and Machaa (and the recent voyage of the *Kon-Tiki*) in the month of April, would reach Easter Island in about two months (as Machaa's did) if steered consistently for the setting sun on a straight voyage, propelled by the trade wind and the southbound branches of the *inner curve* of the Humboldt Current. The four months supposed to have been taken by Hotu Matua's party is quite within a likely margin, provided the voyagers luffed up and bore away to cover as much surface as possible in search of Machaa's party, or in search of new land.

What is more, nowhere in the Pacific, except along the coast of Peru, do we find a land like the one described by the Easter Islanders as Hotu Matua's abode: where, "at certain seasons plants and growing things were scorched and shrivelled up by the burning sun." Rain hardly ever falls—except at intervals of years—along the dry and sandy desert coast of Peru, and cultivation is only made possible by irrigation, where the numerous mountain streams from the interior highlands cross the coastal lowlands en route to the Pacific. During the winter season, when the sun moves north of the equator, damp but rainless clouds and mists cover the dried up coast lands, and a sparse vegetation begins to cover the ground. But as the summer season returns, the incipient growth of plants and vegetation is soon arrested and finally shrivelled up and destroyed by the burning sun. This annual sequence is a climatic and phytogeographic peculiarity of Peru and adjoining Pacific America. It happens to be the most fitting and typical description of the nearest land east of Easter Island, where the land in question was expressly said to be located, but we find nothing answering the description on any of the sandy atolls or verdant volcanic islands west of Easter Island, even if we proceed to Indonesia or the adjacent Asiatic coasts.[1]

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[1] What is more, nowhere in the world do we find coastal stretches better fitted for the designation "the burial place" than are some of the vast desert hills and sandy plains, housing thousands upon thousands of caves or sand-graves containing well preserved skeletons, mummies, and burial goods, that have accumulated in the dry and rainless burial fields of prehistoric Peru. We need only mention names like Chicama, Chimbote, Chancay, Ancon, Cajamarcilla, Paracas, Ica, and Arica, to cover the whole stretch of the Peruvian coast down to Chile with regularly spaced sites, of which no term can be more descriptive than "the burial place". In the largest of these burial fields, whole acres are covered with bones and shattered fragments of burial goods, exposed by treasure-hunters who have had the accumulated grave-material of centuries to pillage in these vast desert graveyards left by the prehistoric peoples of Peru.

Eager defenders of the Malay theory have suggested that the Easter Island traditions must be wrong, and that Hotu Matua came from the west rather than from the east, and by stearing for the sunrise rather than the setting sun, as the traditions say. On this assumption they have suggested that Hotu Matua's starting-point might be the Marquesas Group in the other direction, claiming that this group, as opposed to all the rest of Oceania, has a climate answering the description of the tradition. The Marquesas Group, like the coast of Peru, is two thousand miles from Easter Island, but in the wrong direction according to Easter Island history. Being familiar with the climate in both these areas, and having lived in the Marquesas Group through the different seasons of the year, I can verify that such theories are based on wrong assumptions. Owing to the constancy of the easterly trades, the eastern slopes of the Marquesas collect all the humidity of the drifting air and rising clouds and are covered with verdant rain-forest, whilst the western slopes are generally destitute of forest or even wood land, and are often dry and stony. But at no season of the year does the sun shrivel up and destroy the Marquesan vegetation, nor is the climate more than pleasant for both Polynesians and Europeans.

Certain writers attempt to bring the Easter Islanders in from Asia by arguing that this lonely outpost is too far south to be dominated by the easterly trades. This is not in accordance with reality. Easter Island is under the pressure of the trade winds, just like nuclear Polynesia. The prevailing winds turn from east to south-east and north-east, and the occasional west wind is by percentage too insignificant even to be shown graphically among the other winds on the Pilot Chart of the South Pacific. (U. S. Hydrographic Office and Weather Bureau.) Also, the ocean currents around Easter Island are branches off the main Peru or Humboldt Current coming in from South America. If we keep strictly to meteorological and hydrographic facts, we shall have difficulties in bringing stone age seafarers to Easter Island from Asia. The distance from the tip of the Malay Peninsula to Easter Island, as the crow flies, is the same as by boat from the Mediterranean Sea to Easter Island, by way of Panama (8 000 miles). As the crow flies, Easter Island is as close to South America as to Rapa-iti (2 000 miles), but to a prehistoric voyaging party propelled by the trade winds while travelling on the mobile surface of the sea, Easter Island is more readily approached from Chile and Peru than from even the nearest Polynesian island.

Peru suspected of former "Oceanic" invasion

There is no practical problem behind the early discovery of Easter Island, and much common sense in the tradition accounting for it, if we allow the aboriginal discoverers to do what they say they did, to follow the setting sun. If so, Chile and Peru would be more likely starting-points for the original colonizers of Easter Island than would Java, Borneo, or the Indus Valley. And, actually, with a focusing centre in ancient Peru, we find a prehistoric culture area which, like the Northwest Coast Archipelago, abound in parallels and conspicuous analogies with the early culture of Polynesia. So strong are the evidences of local contact and cultural transfer, that we find precisely what we found in the Northwest Indian habitat: numerous theories have been launched to prove that elements found in South America are due to the landing of Oceanic canoes on the shores of Peru affecting the local cultures from the coast right up to the high plateau of the Andes. As was the case with the theories that Northwest Indian culture had a Polynesian origin, so also with the numerous suggestions that the high cultures of South America have a Polynesian source or inspiration: they have failed to gain recognition because they are too inconsistent with known chronology.

Lydekker (1906, Vol. II, p. 678) says, when mentioning the many theories of a peopling of South America by voyagers from across the open Pacific, that "all these theories are, however, based on a confusion of time and space." Quoting Deniker he adds: "We know positively that the Northmen visited the shores of North America long before Christopher Columbus; and there is reason to suppose that the Polynesians, who are excellent navigators, may have ventured, urged forward by currents, as far as the South American coast. But all these occurrences would be too recent, and such migrations would be, in fact, both too insignificant and too isolated for the peopling of a vast continent."[1]

Lydekker's statement might have been put more strongly, seeing that voyagers would not be "urged forward by currents" from Polynesia to South America, but rather vice versa. (Heyerdahl 1948-50.) In view of this practical observation, and in view of the senior chronology of Peru when compared to Polynesia, and of the inherited information in Easter Island traditional history, we may agree with Allen (1884, p. 251), when he wrote of the Easter Island stone statues: "If it is merely a coincidence that these wonderful antiquities, so closely resembling in character those of Peru and Central America, should exist *on the very next land* to the New-World, it is surely a most curious one..."

The Polynesian megalithic art, and the unidentified sculptors of the early Polynesian era, represent in part what we failed to trace back as Northwest Indian elements in the Maori-Polynesian culture. We may, as a mere working hypothesis, reverse the voyaging direction of the much disputed theories of Polynesian influence in early Peru, and hence avoid the former objections. Again we do it, not primarily to explain existing parallels through trans-oceanic contact, but to search for a feasible origin of one still unidentified component in the complex culture of Polynesia.

Enock (1912, p. 265) once predicted: "The question as to what, if any, relation the stone-shaping art of the unknown people of Easter Island had with that of the early Peruvians is one which doubtless will come up for consideration in the future."

We shall gradually turn to this question in subsequent chapters.

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[1] This chronological observation is frequently pointed out. Sayce (1933, p. 266) says with Joyce: "The greatest difficulty in the way of accepting a Polynesian origin for the Mayan or Peruvian civilisation is a chronological one. It is generally believed that the Polynesians did not reach many of the islands until a period considerably later than that at which the American civilisations had attained a high development."

PART V

TRACES OF CAUCASIAN-LIKE ELEMENTS IN PRE-INCA PERU

TRACES OF CAUCASIAN-LIKE ELEMENTS IN PRE-INCA PERU

No Polynesian border in the east except America

The Polynesian island home has flexible ocean walls. America in the east, and the Micronesian atolls and Austro-Melanesia in the west, form its only known frontiers. Inside this vast water basin a fairly recent amalgamation of at least three distinguishable racial elements has formed an anthropological unit, basically composite, but at present thoroughly interbred as one single people distinct from the other families of mankind.

Easter Island is as close to the South American mainland in the east as is Samoa to the nearest atoll of the Carolines in the west, or to the nearest tip of New Guinea or the Australian continent. But though we have no means of judging how near (in miles) to the South American aborigines the Polynesians would have dwelt had there been any habitable island in the empty stretch of ocean between Peru and Easter Island, yet we do know exactly how far short of New Guinea and Australia they halted, since this ocean does contain islands, on which the black-skinned Melanesians have their home. Wherever Polynesian settlers have penetrated into the eastern margin of this domain, their traces are easily identified in race and culture. Both in respect of distance and direction of favourable winds, Polynesian voyages into the adjoining extremities of Melanesia are too obviously feasible to be disputed, so that wherever evidence indicates vestiges of a Polynesian landing in these marginal groups, the theory of diffusion has been accepted without much controversy, and the conclusions of transfer drawn from these vestiges have been accepted as facts rather than theories. It is therefore significant to note that Polynesian vestiges or settlements on the *far* side of Melanesia, or of New Guinea or Australia—nearer Indonesia—have neither been observed nor suggested. All Polynesian and Polynesian-like *traces* cease with the eastern shores—or those exposed to the east—of Papua-Melanesia, whilst Polynesia proper ceases with Samoa, Tonga, and New Zealand.

This means that we can, on one side of Polynesia, draw an anthropological demarcation-line close to the shores of Samoa and Tonga, yet we cannot with the same certainty draw a corresponding anthropological line in the east right up against the shores of Easter Island. The last Polynesian settlement is, indeed, represented by this last island, yet the border between Polynesia and Peru is not there, but just anywhere in the intervening water. We know that Polynesian craft, at the peak of their navigational experience, about the thirteenth century, had a range corresponding at least to the distance Hawaii-Tahiti and vice versa. The narrow margin between the adjoining sections of Polynesia and Melanesia is thus no norm for the width of the Polynesian-dominated ocean. The ocean range of 2 300 miles we know Polynesians to have covered between Tahiti and Hawaii would take a

Samoan voyager on a direct trip to New Ireland in Melanesia, and, at the other end of Polynesia, it would take an Easter Islander well inside any harbour along the coast of Peru and Chile, and even as far as that of Guayaquil in Ecuador.

Comparative chronology limits the Polynesian sphere of influence

With this freedom of movement, the Polynesian islanders of the twelfth and thirteenth centuries may be tossed about over vast ocean spaces by the speculative writer who fails to take other considerations into account. We must admit that the crews of Polynesian sailing canoes, crossing eastward in the thirteenth century with the same tenacity with which they returned to Hawaii from Central Polynesia, could make a landfall somewhere on the long coast of South America. We must also admit that the same crews, having direct access to the New Hebrides from Samoa, could carry on along the coast of New Guinea to Indonesia and Asia. In the latter case, by adding step to step, the Polynesian could get almost anywhere. But of course, like any continental migrant, he set a limit to his own journeys. It is not only possible, but quite probable, that individual Polynesian sailing canoes, in the later expansion period, forced their way to South America, and, in the opposite direction, pushed on with a fair wind to Indonesia, but we must not forget that they would upon arrival be completely lost in a multitude of aboriginals belonging to old and powerful empires and federations.

A boat-load of stone age Polynesians arriving in Java or Borneo in the twelfth or thirteenth century would be annihilated or absorbed by powerful Javanese and Hindu iron age civilizations of the type encountered by Marco Polo when he passed through the Straits of Singapore in 1291. The crews of Polynesian canoes beached on the coast of Peru in the same periods would find themselves just a handful of visitors among the bronze age subjects of great local federations, among whom the Inca dynasty was just rising to power. In neither case would the voyaging party find virgin soil for a homestead, nor primitive savages to impress and inspire with their own neolithic culture. The period of Polynesian expansion comes too late in the history of mankind to permit a boat-load of stone club warriors to create a lasting impression or effect any changes among organized civilizations in the outside world. This is a quite obvious and conclusive reply to the constantly recurring claims that there is evidence of Polynesian influence in Peru. If we analyze the question whether the complex Polynesian island culture may not be receiver rather than the giver in its relation to early Peru, we shall find that this alternative view implies not merely that the voyage went away from Peru with a favourable wind and current, but also that we authomatically shall have to consider a completely different time level for the Polynesian contact with Peru.

Polynesia and the chronology of Peru

If the Polynesians had come from the Old World, and pushed east until a small group reached Peru, they would have reached it at the *end* of their migratory expansion; but, if they moved the other way and *entered* the ocean from Peru, they must have *left* Peru at the very *beginning* of their migratory epoch. We have seen that the fifth century marks the approximate era when the first migrants entered Polynesia, and that the eastern outpost, represented by Easter Island, was settled at the very opening of this period by men who declared that they had come from a scorched land far to the east, fifty-seven generations before the turn of the last century, according to local genealogy.

This makes a great difference to our chronological approach to the diffusion problem, as it necessarily involves an entirely different time period in our relations with Peru, reaching back into periods antedating the Inca rule, when the extinct high-cultures known to us as Chimu, Nazca, Chavín, and Tiahuanaco flourished in one of their various degrees of progress along the desert coast and in the highlands above the Pacific.

We do not know just when the Incas came into power, but we have a guide in the fact that the hierarchy of Peru also was founded on ancestral worship, with a dynasty who claimed divine origin and thus kept careful track of their own genealogies and family lines. The late arriving Quzco Incas, just like the late arriving Maori-Polynesians, added their own genealogy on to that of their cultured predecessors merely as a subsequent line. (Means 1920 b.)

Bennett (1949) dates the actual Inca rulers from about 1250 A. D., and Means (1920 b, p. xlv) from about 1100 A. D. Even if we allow a fair margin and include more doubtful names in the actual Inca lines, we must admit that a local period corresponding to the fifth century expulsion to Polynesia takes us back to a definite pre-Incaic period in Peru, when not only iron but even bronze and other hard metals were unknown, and when the Peruvian stone adzes were still in use as in early neolithic times, because the gold, silver and copper of the Tiahuanaco periods were all too soft to compete with the better quality of a hard polished stone-blade. (Bennett and Bird 1949, p. 193; Kroeber 1930 a, p. 109.) As well is known, the subsequent Inca had attained a bronze-age culture, but they never reached the iron-age until the arrival of the Spaniards. Iron was never worked in any part of the aboriginal Americas.

As stated, the moment we turn to Peru to seek local *emigrants* instead of *immigrants*, we turn our attention from the Incas and their contemporaries, to cultures of the earlier Tiahuanaco periods. This means that a mere comparison between *Inca* and *Maori-Polynesian* traits and elements will have but little bearing on the question before us.

The dominant Maori-Polynesians of historic times came by way of Hawaii and had, before their arrival, little if anything to do with the former invaders of Polynesia. Roughly about the same time, the Incas rose to power in the east and spread their culture all over the adjoining regions of South America, overlapping all the former and alien high-cultures which had flourished in various parts of Peru since many centuries before the time when the earliest Polynesian settlers established themselves in the adjacent ocean. Instead of here comparing two unrelated invaders, the Inca and the late Polynesian, who came from different sources and conquered different geographical areas, we must look beneath the surface for the possibility that they have both covered up local vestiges of the same stock of culture-bearers.

Since we have seen that A. D. 500 represents the approximate period for the first invasion of Polynesia, it would be a natural step to consider roughly where A. D. 500 would place us in Peruvian chronology.

In South America our means of dating the prehistoric cultural sequences have been very inadequate (Linné 1939, p. 9), and all proposed datings should, as in Polynesia, be regarded as rather approximate, at least until a further advance in comparative archaeology, or the study of chronology through the recently developed "Carbon 14 method", has given added weight to our present suppositions. Yet we know with certainty that highly developed (but neolithic) cultures flourished in Peru from the earliest Christian centuries, and probably even long before, according to what has been deduced from the recent excavations by Bird. (Bennett and Bird 1949.) Thus the cultural antiquity of aboriginal Peru dates back to periods long before the earliest colonization of the Polynesian islands. We know with equal certainty that in the middle of the first millennium A. D. leading cultures, some of which surpassed and inspired the subsequent culture of the Incas in their artistic taste and architectural achievement, began active trade relations along the Pacific desert coast of South America, as well as back and forth between the coast and the interior highlands of the Andes. The essential local cultures of this important pre-Incaic period were the Early Chimu on the coast of northern Peru, the Early Nazca on the same coast further south, the Chavín of the northern highlands of interior Peru, and the Early Tiahuanaco of the same interior plateaux further to the south. There were also a number of minor subcultures and intermediate stages, encouraged by tribal distinctions as well as inter-tribal trade and diffusion.

One of the most outstanding, vigorous, and widespread of these pre-Inca cultures was that of Tiahuanaco, whose external influences are traceable over vast continental territories of Pacific South America.

Both Bennett (1943, p. 326) and Kroeber (1944, p. 115) show that archaeology reveals the existence, before the era of the Incas, of two great expansion periods in Peru, when in turn each of the two main highland cultures, the Tiahuanaco and the Chavín, spread to attain pan-Peruvian influence. It is furthermore generally agreed that there were also at least two main phases of Tiahuanaco culture. This was first deduced by Posnansky (1914), who argued from an observation of local differences in material and building technique, while Bennett (1934) later found what was apparently a safer stratigraphy in ceramic styles.

On the basis of detailed archaeological information contributed by Uhle, Tello and Kroeber, the noted Peruvian scholar Means (1931, Chap. IV) has given a good summary of the complex problem connected with the distribution of the important Tiahuanaco culture and its influence throughout the Andean area. The same author wrote, with reference to the two distinct periods of Tiahuanaco (1917, pp. 326, 327): "If Tiahuanaco I was probably contemporary with the Proto-Chimu and Proto-Nazca cultures of the coast, Tiahuanaco II is no less probably derived, at least in part, from the latter of those two coast cultures." Further: "It may be true that it is dangerous to measure the actual spread of a culture by the boundaries of the territory within which remains of distinctive products are to be found. *Political* affinities, of course, cannot be determined by any such evidence, but nevertheless, the fact that Tiahuanaco II objects are found from Colombia to Argentina is a proof that the *cultural* dominance of Tiahuanaco II was exceedingly widespread."[1]

Means (1920 b, p. xlv; and 1931, p. 112) further proceeds to establish an approximate

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[1] We have found no other references to Tiahuanaco objects found in Colombia, and doubt that such finds have actually been identified, although, as will be shown, several writers claim a *source* relationship beneath the original cultures of San Augustin (in Colombia) and Tiahuanaco.

Peruvian chronology, based on modern archaeological research, and supported—as was the analogous case in Polynesia—by a genealogical list of kings and prehistoric events as preserved by the Inca historians. He dates the Early Tiahuanaco period (Tiahuanaco I) roughly from the second century A. D. until about 500 A. D., and he also considers 500 A. D. to mark the termination of the Early Chimu-Nazca cultures which in the same early Christian centuries had flourished on the Pacific coast down below. According to Means, the Tiahuanaco I culture was restricted to the interior highlands, while the Early Chimu and Nazca cultures sprang up on the coast. At the end of this early period, roughly about 500 A. D., the Tiahuanaco II empire arose and expanded its power right down to the Pacific Ocean, leaving definite traces all up and down the lowlands, and opening active trade relations with the coast that also inspired and affected the highland culture of the subsequent epoch.

We thus see that the Tiahuanaco Empire is thought to have expanded its power down to the Pacific coast of Peru at a period roughly coinciding with the first colonization of Easter Island and the other groups of Polynesia. This is interesting, as the establishment of a pan-Peruvian empire, and the meeting between great and powerful aboriginal dynasties like those along the coastal plains and that of the highland Tiahuanaco, with the victory and extension of the latter, would necessarily involve serious wars and tribal disturbances on the nearest shores east of Polynesia.

Means (1920 b, p. xliv), upon analysing the Inca genealogies pertaining to pre-Inca kings and important events in Peru during their reigns, and allowing 25 years to a Peruvian generation, concluded that the fifth century A. D. was one of the most disturbed periods in the early era of Peruvian culture. In his "Table V: Chronological and Historical Events in the Pre-Inca Period of the Andean Region," he gives the following events, the dating of which, he stresses, is approximate:

"375-450 [A. D.]...	Constant Wars with the Chimus on the Coast; The Mountain People Build Fortresses for Protection against Them. Fortress of Huanco Built. A Bloody Battle with the People in the South."
"450-500 [A. D.]...	The Power of the Coast People is Limited."

We recall that the historical traditions of Easter Island claimed that 57 generations before Thomson's time—or, allowing 25 years to a generation, about 475 A. D.—Hotu Matua and his followers fled from a desert land to the east and reached Easter Island after combing the ocean westward for 120 days in search of land. Their reason for departure was to escape a superior enemy. Writing of this lonely island, Routledge also (1919, p. 294) emphasises: "They tell us that their ancestors were compelled to leave their original home through being vanquished in war. This was a very usual reason for such migrations, as the conquered were frequently compelled to choose voluntary exile or death; ..."

I do not unduly stress the datings 450—500 A. D. for the victories of the highland people over the fishing population along the Peruvian desert coast, nor the dating 475 A. D. for the flight of Hotu Matua which resulted in the primary discovery of Easter Island. All these data are based on genealogies and are therefore very approximate. But I would like to insist that in the early generations when man first fled into the open East Pacific Ocean, there were outstanding high cultures fighting for possession of the coastal stretch of Pacific

South America, where refugee families, as will be demonstrated later, had no means of concealment in the open desert country, but had the advantage that they could embark in their coastal fishing-craft to seek escape by sea.

We have shown how, in the constantly recurring attempts to demonstrate cultural relationship and racial transfer between Oceania and Peru, it has been taken for granted that an island-bred culture must have been carried over the ocean to South America from the west. This theory has consistently stranded on chronological considerations. Peruvian archaeologists, basing their calculations upon the early results of Uhle, Tello, and others, have long shown that the ancient local high-cultures, like the Early Chimu and the Tiahuanaco I, flourished in Peru as early as 200-300 A. D., or about two or three centuries before culture reached Polynesia. The newly invented method of testing the antiquity of fabrics and vegetable compounds by the "Carbon-14 method" has enabled recent archaeologists to push these Peruvian time limits for local culture back at least another two thousand years. Thus Dr. Junius Bird of the American Museum of Natural History (see also Bennett and Bird 1949), has informed me that remains of cultivated plants, like *Gossypium barbadense*, *Lagenaria siceraria*, *Cucurbita ficifolia* and *C. moschata*, as well as remains of bark-cloth, were found by him at the base of a fifty foot refuse mound on the coastline of Chicama Valley, Peru, and that his own guess as to the antiquity of these remains, later supported by radio-carbon tests, places them in a period between 3000 and 1000 B. C.[1]

Although the antiquity of Peruvian culture has proved to be much greater than what was suspected until Bird's excavations were dated, nothing was found which has changed the time level of the bronze age in Peru, which had not begun in the Early Chimu period of the coast (*Ibid.*; Kroeber 1930 a, p. 109; Bennett 1949, p. 130), and which was thus introduced locally only in periods after the first settling of man in Polynesia. Nor, as shown by Bennett (1949, p. 193), has any bronze been found in Tiahuanaco. Pottery, however, although absent in Bird's earlier culture level on the coast, was by 500 A. D. found everywhere both in the highlands and on the coast of Peru, as opposed to what was the case among the Northwest Coast Indians and the Maori-Polynesians, a fact to which we shall soon return.

The approaches to information on the Inca predecessors

If the many so-called "Oceanic" elements in Peru actually should prove to be wind- and sea-borne "Peruvian" elements in Oceania, then their occurrence in Polynesia should be investigated with the same objectivity as the wind- and sea-borne Polynesian elements further down in Melanesia. There will be no valid excuse for ignoring the possibility of Peru-Polynesian diffusion the moment we reverse the process and bring elements of great continental high-cultures to small unoccupied oceanic islands, not up towards the east but "downhill" with the winds and the current, and not in an impossible period when the Incas dominated Peru, but in considerably earlier and neolithic Tiahuanaco, Chimu, or Nazca centuries.

It is obvious that a comparative study of surviving modern tribes, like the Kwakiutl Indians and the Maori-Polynesians, is much easier than an attempt to compare two purely

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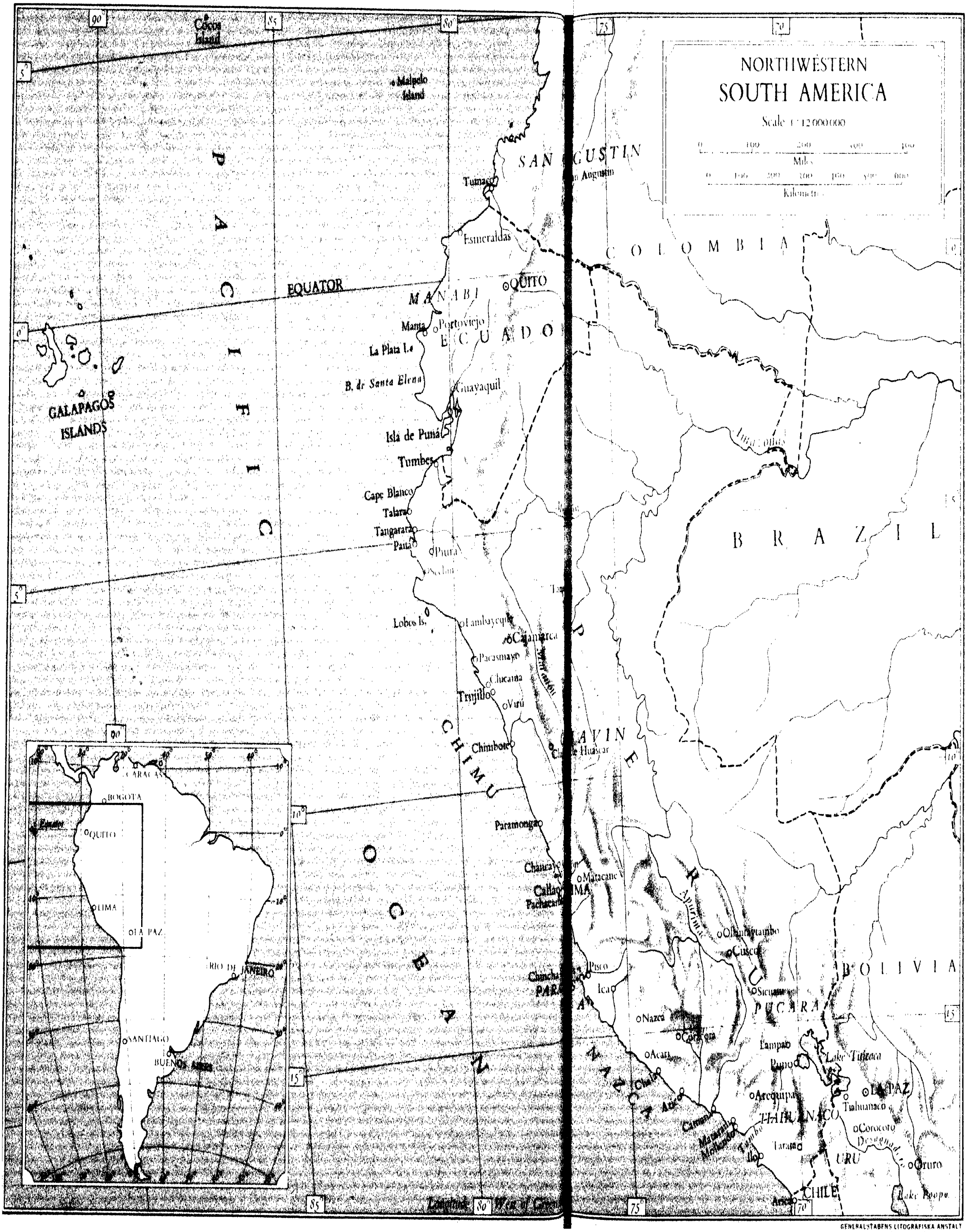
[1] J. B. Bird: Letter 28th March 1949; and *viva voce*.



GENERALSTABENS LITOGRAFISKA ANSTALT
STOCKHOLM 1962

prehistoric peoples, like the pre-Incas and the very first settlers on the Polynesian islands. Yet even they have left impressions which make it possible to study and compare a great number of their principal characteristics—mainly cultural—but also a number of important racial aspects.

Modern anthropology has shown us that the Polynesian racial type represents first of all a mixture of two distinct physical types, the Mongoloid and the Caucasoid, both strongly represented, and then to a very slight degree some sporadic negroid elements which are only natural because of the proximity of the Austro-Melanesian tribes with whom the Polynesians share frontiers. The modified Mongoloid, which is the dominating physical type in Polynesia, may be explained through a common parentage with the insular tribes of Northwest America, and an arrival of the last immigrant stock from that northern area may also explain a certain proportion of the Caucasoid stamp in Polynesia, but not all. We are therefore still left with the problem of the racial and cultural origin of the first tribes occupying Polynesia prior to the Hawaiki interference. Since the racial complexity of the present Polynesians indicates that these former island occupants have been absorbed rather than expelled or exterminated, we cannot refer to them as pre-Polynesians nor perhaps as proto-Polynesians. They form *part* of the Polynesians if we accept that their descendants are traceable as an element in the present island stock. Since we have chosen the term 'Maori-Polynesian' to describe the dominant type of modern islander, descended from the immigrants who came down through Hawaiki in the present millennium, we may for the sake of convenience use a denomination like 'pre-Maori-Polynesian' or also 'Early Polynesian' to distinguish the first discoverers and settlers. The pre-Maori-Polynesian or Early Polynesian racial type yet to be accounted for is the one who gave so many Polynesian tribes a Caucasoid stamp more marked than even among most Northwest Coast Indians. In Maori-Polynesian memory some of these, their predescessors and part ancestors, were the *uru-kehu* elements, the *Patu-pai-arehe*, described in the island memories as fair and often light-haired people, as sporadically observed in most parts of Polynesia also by the first European discoverers. Neither physical anthropology nor native lore have furnished us with evidence justifying the use of the terms Caucasian, European, or Nordic, occasionally used to describe this non-Mongoloid type, occurring sporadically and quite unexpectedly on the lonely islands of the Pacific. As Ferdon and Reed[1] point out, all we are confronted with are certain specific characteristics of complexion, hair, etc. which indeed are characteristic of some, but not of all members of our own race. Nor do they perhaps cover all characteristics of any Caucasian race. We shall therefore prefer to use the term 'Caucasian-like' to denote non-Mongoloid and non-Negroid elements, like fair skin, soft, fine, or wavy hair texture, reddish-brown or blond hair colour, etc., whenever found on unidentified aborigines outside the territory of Caucasia and Europe. It may also be necessary to emphasize that, although such Caucasian-like individuals were seen and described by the early Europeans, and before them by the Maori-Polynesians themselves and their illiterate historians, yet we always hear of them as individuals or small groups in the midst of natives who otherwise share their main characteristics with the subsequent Maori-Polynesian norm. We may well turn back (to p. 191) and repeat the information Cowan secured from an old Maori expert about this pre-Maori people:

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[1] E. N. Ferdon and E. K. Reed, personal communication, letter 21th May 1951.

"In appearance some of them were very much like the Maori people of today; others resembled the Pakeha (or white) race. The complexion of most of them was kiri puwhero (reddish skin), and their hair had the red or golden tinge which we call uru-kehu. Some had black eyes, some blue like fairskinned Europeans. They were about the same height as ourselves. Some of their women were very beautiful, very fair in complexion, with shining fair hair."

To look to Peru for aboriginal Pacific explorers or castaways who included red-haired *uru-kehu* individuals and types more Caucasian-like than even the Maori himself, seems a rather discouraging prospect, at the very best. The physical features of the known Indian tribes of coastal and inland Peru are less Caucasian-like and more Mongoloid than all Maori-Polynesian and most Northwest Indian tribes, at least with regard to hair texture and colour, facial expression, and skin. We might therefore have been led to ignore and overlook any further possibilities in this direction, had not a number of factors to be discussed in later parts urged the impression that, even if there were no apparent racial evidence, there was certainly sufficient cultural evidence in early Peru to require a second glance in that direction. Urged by accumulated archaeological (Part VI) and botanical (Part VII) data, we reconsidered the possibility of what we had first judged to be a fantastic idea, that red-haired culture-people, sharing their general characteristics with the Caucasian rather than with the Mongol race, might have been present in pre-Inca Peru although unknown locally in historic time.

Naturalistic portraiture of models seen by Early Chimu artists some 1500 years ago in aboriginal Peru showed that Caucasian-like types were represented among them although unfamiliar among the local pure-bred Indians of today. (See Plates XXVI—XXVII.) This in itself was a most surprising and stimulating fragment of prehistoric information. Next, by turning our attention to the well preserved Peruvian mummies from the desert tombs at Paracas and other pre-Inca necropoli from later centuries B. C. and the earlier centuries A. D., we found that one of the problems they offered modern science was the colour and structure of their hair. (See Plates XXXIV—XXXVI.) Among those best preserved, which had been kept away both from light and from contact with the sand, some had the coarse, straight and black hair of the Mongol and the average modern Peruvian Indian, but there were also a great number with reddish-brown hair (sometimes interspersed with yellow), and with a fine, silky and sometimes even clearly wavy texture. (Wilson 1862, Vol. II, pp. 228, 235, 246; Busk 1873, p. 313; Reiss and Stübel 1880—87, Pl. 16, 17; Dawson 1928, p. 127; Trotter 1943, pp. 69—75; etc.)

Thus when we venture to check further the possibility of bringing what we have called 'Caucasian-like' elements out of prehistoric Peru, our object is first to test whether or not we have any evidence of such people having ever existed in that East Pacific territory. Not until we have verified this evidence will we be able to judge whether or not there is reason to believe that this people had sent a branch into Polynesia. It should thus be made very clear that the purpose of this part (V) is not to show the evidence for migration, but to show that, contrary to general belief, prehistoric Peru has housed racial elements which in many respects must have approached the characteristics of our own white race, while differing correspondingly from the norm of Quechua and Aymara Indians of our time. We may, in places, draw a few parallels back to the Polynesian territory, but in general our object is to pave the approach to succeeding parts, by showing that the non-Mongoloid peculiarities of the pre-Maori-Polynesians form no obstacles to a primeval settling of these islands from early Peru, and by pre-Inca voyagers who included among them Caucasian-like individuals with *uru-kehu* hair. The actual arguments for migration from Peru will follow in the later parts.

There are several distinct avenues of approach to gain information pertaining to the now extinct culture-bearers of Peru at the time when the first boats were beached on Easter Island. We may, through archaeology, gain knowledge of their arts and crafts and other aspects principally of material culture. We may also, through ethnology, extract from the social customs and religious beliefs of the Inca such elements as are not original to them but were borrowed from their predecessors. We have also seen that there are different channels of information regarding the physical appearance of the actual bearers of these long extinct Peruvian high-cultures. We may look for their somatological remains in the form of dried-up mummy-bundles or skeletons, and thus judge of individual appearances directly, as far as these remains will permit. We may also look for realistic prehistoric illustrations of racial types depicted in the early period and by the people in question. Oral information may also have survived. The cultural inclinations of the late Incas were focused on ancestral history and pedigrees, and may have carried down to historic times live memories of unusual people or outstanding individuals flourishing in older Peru.

Since we shall in the present part follow each of these approaches, the sequence is not of determining importance. The material vestiges of archaeology will always be the firm backbone of prehistoric reconstructions, yet they may at times remain as backbones only, unless flesh is built upon them by data from written or oral history. We feel that this would be the case with the long known bearded effigy jars and red-haired mummies from the desert graves of early prehistoric Peru, and we venture accordingly to see if they will not attain more vivacity and a better reason for being there when reexamined and judged upon a background of verbal Inca history.

The modern literate has the great benefit of being able to help his overfilled memory by writing notes and narratives. But he sometimes forgets that the minds of early primitives were far from overfilled, and that they were thus able to preserve tribal traditions and ancestral songs often with remarkable accuracy. Inca historical traditions were not fiction or fairy-tales, although full of superstition. They were sincere and deliberate efforts to memorize events as they and their ancestors had seen and interpreted them.

About twelve native generations after Pizarro's conquest of the Inca Empire, Stevenson (1825, p. 401) wrote of the disorganized and illiterate descendants of Inca subjects: "Their veneration for the memory of their Inca (Atahualpa) is beyond description, particularly in some of the interior districts, where his decollation by Pizarro is annually represented." This, moreover, among the lower class of natives, after the passage of post-Columbian centuries disturbing to their way of life, the people lacking a common bond such as that formerly afforded by the organized Inca worship and cult. Twelve similar generations of tradition in *Inca* time would carry us from the Spanish conquest back to the very beginning of Inca history, and one should expect then that the Inca historians who were interviewed by the arriving Spaniards, should have correspondingly vivid memories of some of the highlights in pre-Inca time.

To understand that Inca memories, like those of the Polynesians, stand in a different class from those of the average barbarian, we may note what Sarmiento de Gamboa (1572, p. 40), a famous navigator as well as chronicler, and familiar with the native Peruvian aristocracy after the Spanish Conquest, wrote in his early *History of the Incas*:

"Before entering upon the history of the Incas I wish to make known or, speaking more accurately, to answer a difficulty which may occur to those who have not been in these parts. Some may say that this history cannot be accepted as authentic, being taken from the narratives of these barbarians, because, having no letters, they could not preserve such details as they give from so remote an antiquity. The answer is that, to supply the want of letters these barbarians had a curious invention which was very good and accurate. This was that from one to the other, from father to sons, they handed down past events, repeating the story of them many times, just as lessons are repeated from a professor's chair, making the hearers say these historical lessons over and over again until they were fixed in the memory. Thus each one of the descendants continued to communicate the annals in the order described with a view to preserving their histories and deeds, their ancient traditions, the number of their tribes, towns, provinces, their days, months and years, their battles, deaths, destructions, fortresses and 'Sinchis'. Finally they recorded, and they still record, the most notable things which consist in their numbers (or statistics), on certain cords called *Quipu*, which is the same as to say reasoner or accountant. On these cords they make certain knots by which, and by differences of colour, they distinguish and record each thing as by letters. It is a thing to be admired to see what details may be recorded on these cords, for which there are masters like our writing masters. Besides this they had, and still have, special historians in these nations, an hereditary office descending from father to son. The collection of these annals is due to the great diligence of Pachacuti Inca Yupanqui, the ninth Inca, who sent out a general summons to all the old historians in all the provinces he had subjugated, and even to many others throughout those kingdoms. He had them in Cuzco for a long time, examining them concerning their antiquities, origin, and the most notable events in their history. These were painted on great boards, and deposited in the temple of the Sun, in a great hall. There such boards, adorned with gold, were kept as in our libraries, and learned persons were appointed, who were well versed in the art of understanding and declaring their contents. No one was allowed to enter where these boards were kept, except the Inca and the historians, without a special order of the Inca."

We see, at least, that the Inca historians strove to preserve and memorize information inherited from earlier generations, and we may presume that some main characteristics and outstanding features of the pre-Inca civilizations would survive in Inca Peru just as tribal history survived in Polynesia, and just as the memory of Atahualpa's decollation by Pizarro survived until modern times.

The pre-Incaic importance of the cult site at Tiahuanaco

There is within the borders of the former Inca Empire no prehistoric site with monuments and other architecture of more impressive dimensions, and with evidence of a higher cultural level, than the ancient megalithic ruins of Tiahuanaco in the Bolivian highland plains south of Lake Titicaca. To the Inca and his subjects the ruined site of Tiahuanaco was the principal edifice of the foreign race that dwelt in their land long before the time of the first Inca. To the modern archaeologist, Tiahuanaco is the focusing centre or at least the best preserved site of the pre-Inca and once pan-Peruvian culture named after its ruins. Yet the real founders of Tiahuanaco and of the culture bearing its name have never been identified (Montell 1929, p. 15; Karsten 1938, p. 28) in spite of the many and diverse theories which bear upon the question. But, although we do not know the tribes or individuals who ordered and directed the erection of the present ruined site, and who carried related art-conceptions far and wide in pre-Inca Peru, yet we must necessarily count with their former existence, since, as shown, the Tiahuanaco cultural influence in its expansion period represents a principal phase in the pre-history of Peru.

As shown above, Means (1931, Chap. IV) has given a good impression of the vivid activity and complex distribution of Andean Tiahuanaco culture and influence in early pre-Inca periods. Bennett (1943, p. 323), a noted Tiahuanaco archaeologist, writes: "Since the beginning of the century the major outline of Andean chronology has been based essentially on the extensive excavations by Max Uhle. Much of the work that has followed has refined the Uhle classification and added other details, but has not made any major changes. The Uhle outline was based on the concept of two pan-Peruvian periods: the Inca period, which had spread throughout a major portion of the Andean region at the time of the coming of the Europeans; and the earlier Tiahuanaco period, which had a somewhat limited distribution from the home site in Bolivia, thence up and down the coast and highlands of Peru, and into Argentina, Chile, and Ecuador."

It is clear that the mobile culture-bearers behind such a dynamic high-culture, which in its art and architecture surpassed (but inspired) the culture of the subsequent Incas, must have included individuals with outstanding intelligence, abilities and ambitions, which cannot be judged by the low standards of the historically known Aymara- (Colla-) Indians of the district. Nor do these local Indians make the slightest claim of descent from the architects and founders of Tiahuanaco, although the colossal ruins are the central element in all their traditions and religious beliefs, just as they were to the aboriginal population in wide regions during the early Inca Empire.

Since the unidentified founders of Tiahuanaco play a principal part in the archaeology of pre-Inca Peru, and since the ruins are venerated by the local Indians both on account of their grandeur and their role in Peruvian traditions and mythology, we must presume that some recollections of the founders of the monuments and walls would survive from one generation to the next, provided the district had not for long periods been entirely depopulated.

The legendary reference to "white and bearded men"

If our supposition is founded in fact, the early immigrants into Polynesia should be linked up with culture-bearers living during the Tiahuanaco periods of Peru. Of the three physical components of Polynesia, these people would represent the Caucasian element. This element is on the islands somatologically identified as an early racial component reaching Polynesia independently, to enter into the subsequent formation of the composite island tribes. It is recalled in Polynesian traditions as the light-coloured children of

Tangaroa, who lived among their ancestors; it is described by the early European discoverers as strongly bearded "white" men among the aborigines, jokingly referred to as "the Fleming" or as "a countryman"; and it is occasionally embodied in the fair *uru-kehu* strain of widely separated islands.

If these early prehistoric voyagers actually set out from the coast of Tiahuanacoid Peru, they must inevitably have been seen and memorized by the local aborigines in the midst of whom they dwelt. On these premises, the contents of the earliest Inca memories may well be worth a new inspection, even though, on account of their seemingly fantastic nature, they have been neglected in most serious studies of Peru.

Until a hundred years ago, the Colla Indians of the Titicaca plateau had preserved traditions associated with the erection of the colossal stone constructions on the plains south of Lake Titicaca. In 1863, Bollaert wrote in his paper on "The pre-Incarial Ruins of Tia Huanaco" (p. 235): "There are vague traditions that Tia Huanaco was built by white and bearded men." Describing the same ancient ruins, Inwards (1884, p. 32) states with Humboldt that "... at the arrival of the Spaniards the natives attributed the construction of them to a race of white and bearded men who inhabited the ridge of the Cordilleras long before the foundation of the empire of the Incas."

In 1908, at the International Congress of Americanists, Gonzales de la Rosa brought up the same question (p. 411): "Another problem which presents itself is that of the race which reigned at Tiahuanaco. Were its inhabitants Quechuas, Aymaras, or something else? On this point, more than on any other, the greatest obscurity remains. ... the tradition, to indicate this discrimination, says that there lived on the islands [of Lake Titicaca] a race described as *white and with beard*—which is the same as in Tiahuanaco—but which cannot be Quechua, although it seems to differ from the present race, and of which one can hardly believe that it was *literally white*."

When the original Quechua and Colla traditions gradually petered out about the turn of the last century, European visitors to the ruins obtained local information only from what they saw, the surrounding natives had nothing else to add. European interest in what had now been reduced to *former* native beliefs decreased accordingly. One may well say that, with the disappearance of the last native accounts orally inherited from the time of local eyewitnesses, Tiahuanaco's last meagre thread of spiritual survival terminated, the ruins became archaeology. To us in our day Tiahuanaco is reduced to a convenient terminology for a wellknown art-style—truly impressive and famous monuments over no one knows what.

During the first generations after the Conquest, however, the myths and traditions of the legendary pre-Incas were still alive in Peru, and when the famous historian Prescott began to analyze the early Spanish documents and manuscripts in the archives of the Royal Academy of History at Madrid, he came to the following conclusion concerning the early Inca beliefs (1847, Vol. I, p. 9):

"The story of the bearded white men finds its place in most of their legends." He also wrote (*Ibid.*): "Another legend speaks of certain white and bearded men, who, advancing from the shores of Lake Titicaca, established an ascendancy over the natives, and imparted to them the blessings of civilization. It may remind us of the tradition existing among the Aztecs in respect to Quetzalcoatl, the good deity, who with a similar garb and aspect came up the great plateau from the east on a like benevolent mission to the natives. The analogy is more remarkable, as there is no trace of any communication with, or even knowledge of, each other to be found in the two nations."

Cieza's account of "white and bearded men" at Titicaca

Written by a local eye-witness in the years immediately following the Conquest, the early records of the noted Spanish chronicler Cieza de Leon (1553—60) are naturally more important than most subsequent narratives. Cieza was one of the earliest Europeans to visit the ruins of Tiahuanaco on the Titicaca plateau and to collect prehistoric traditions among local natives, who had only known Europeans for a few short years. In his chronicle of Peru (First Part, p. 327) Cieza includes a chapter "On the Tiahuanaco Village and Great and Ancient Buildings Seen there", which represents the first recorded description of this site. He says:

"I asked the natives, in the presence of Juan Vargas who is the one holding authority over them, if these buildings had been constructed in the time of the Incas. They laughed at this question, affirming what has been already stated, that they had been made long before they ruled, but that they could not state or affirm who made them, but that they had heard from their forbears that what is seen now was made in one night. For this reason, and also because they say they have seen bearded men on the island of Titicaca and that the building of Vinaque had been constructed by similar men, I say that perhaps it may be that before the Incas reigned there may have been some people of intelligence in these realms, come from some parts not known, who had done these things, and they being few in number and the natives many they might have been killed in wars."

Cieza's allusion to the "bearded men" of pre-Incaic Titicaca and Vinaque is a direct reference to his own narrative in a previous chapter. (*Ibid.*, p. 314.) There he stated that several Colla Indians had informed him how, at the remote time of the great chiefs Zapana and Cari, who ruled before the establishment of the early Inca dynasty, "white and bearded men" had been massacred on the largest island in Lake Titicaca. Cieza returns to the same pre-Inca people in his Second Part (Chap. IV), saying: "They also tell what I have written in the First Part, that, on the island of Titicaca, in the past centuries, there was a bearded people white like us, and that a chief by the name of Cari came from the valley of Coquimbo, mustering where Chucuito is at present, from where, after having made some new settlements, he passed over to the island with his men, and waged such war on the people of which I speak that he killed them all."

About three hundred and fifty years after Cieza received this traditional information, that is to say about fourteen native generations later, Bandelier (1910, p. 294) went to carry out excavations among the ancient ruins on Titicaca Island in the lake near Tiahuanaco. Fragments of the prehistoric tradition were apparently still alive among the aborigines, for he was enlighted by an 'old native wizard' concerning the earliest days on the island: " 'In very ancient times,' said he 'the Island was inhabited by gentlemen (caballeros) similar to the viracochas' (name given to whites by the Indians to-day). Whence these 'gentlemen' came he knew not." Bandelier's native informant knew that, according to tradition, the said caballeros had intercourse with the local native women, and their children "became the Inga-Ré (Incas), and they drove out the gentlemen and held the Island thereafter." Whither the expelled caballeros or viracochas retreated, the local islanders could not tell. Bandelier adds that: "The 'Viracochas' here mentioned recall the 'white and bearded men' of Cieza."[1]

Garcilasso and other early historians will later show us how the distant family of the Inca, dwelling three hundred miles to the north, pointed out that their progenitors, the first Incas, emerged from this very island in Titicaca to make their way northwards to Cuzco and establish their sovereignity over the Peruvian peoples. Various other early chroniclers will tell us how the natives in wide parts of Peru had the inherited belief that this same island had been the chosen home of a group of fair-skinned people with beards, who had been very active spreaders of culture before the Incas came to power. Generally we learn that some such "white" men left Titicaca Island for the neighbouring Tiahuanaco, moving down subsequently from the highlands to the Pacific coast; but we sometimes learn of the defeat or murder of similar men who still remained on Titicaca Island. Bandelier (*Ibid.*, p. 327) cites Ramos, who also spoke of "a mysterious white man called Tunupa and Taápac" whom the early Indians remembered having killed on Titicaca Island. In other local dialects this legendary "white man" is referred to as Tonapa and Tarapaca, and also as Tupaca.

The "white and bearded men" near Ayacucho

During my visit to Peru in 1947, I was informed by Dr. Luis Valcárcel of the Museo Nacional in Lima, that the tribes near Ayacucho, in the cordilleras between Lima and Cuzco, had until recent years upheld the same tradition from the time of Cieza: that the local and pre-Incaic Vinaque ruins had once been built by a race of men "white like Europeans", who had lived among their ancestors in the dim past of Inca history. Cieza (1553—60, Chap. LXXXVI) gave the same account of these particular ruins *some four hundred years ago*, when he arrived in Peru in the decades of the Conquest. Speaking of these "great and very ancient buildings" on the river Vinaque, he says: "When I questioned the neighbouring Indians as to who had made that monument of antiquity, they answered that it was another people who had been bearded and white like ourselves, who they say, came to these parts a long time before the Incas reigned, and made their residence there."

The Viracocha-people

Karsten (1938, p. 194) cites the ancient writings of Huaman Poma Ayala concerning the traditions of the former inhabitants of Peru. Huaman Poma was a native Peruvian who was himself instructed by the trained Inca historians, the socalled quipucamayocs, concerning the earliest Inca knowledge. From him we learn that "the first race of man that dwelt in Peru" was called *uari viracocharuna*. The suffix *runa* is merely the Quechua (Inca) word for "people", and we recognize thus in this name the word viracocha, which is, as cited from Bandelier, the Quechua term for all past and present peoples with "white" or very light skin colour. Viracocha is also used by the Inca as the name of the leading pre-Inca hierarch and man-god who was to the earlier people in Peru precisely what the later Inca actually was in the eyes of his subjects, a divine representative of the sun among its human descendants. Whether these pre-Inca *uari viracocharuna* gave their name to the Inca god and progenitor *Viracocha*, or whether they are named after him, may be difficult to determine without a further analysis of Peruvian beliefs and tradition. In all likelihood *Viracocha* was originally a descriptive term or hereditary title rather than a personal name of one distinct individual, just as *Inca* subsequently became the hereditary title of a whole dynasty. Similarly among the Aztecs, Quetzalcoatl was a principal god and progenitor, and yet the same name was the name or title of his successive line of leading priests.

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[1] Bandelier (*Ibid.*, p. 66) shows that the Indians of Titicaca Island possibly were forced, by the pressure of official Spanish measures, to move over to the mainland for a few years at the close of the sixteenth century, but they soon moved back again. He adds: "...but there seem not to have been any white settlers on it until the eighteenth century, or perhaps later."

In Inca history, as in our own, we naturally find that the doings of the mass of the people play a less important role in oral tradition and written narrative than do the travels and activities of a king or emperor. To learn more about the *uari viracocharuna* or viracocha-people we may therefore turn our attention to their chief, remembered as Viracocha, or Con Tici Viracocha. With his activities begin all the earliest Inca memories of events leading up to the introduction of cultural ideas among the primitive Indians in Peru. It is our object, not to dwell on myths and superstitions, but to extract from them the kernel of historic truth which is to be found wherever tradition survives for centuries among a numerous and widespread population who take a keen interest in the preservation of their own tribal histories. We need not take any definite attitude to whatever impression the Inca conceptions may leave behind, until we find them to coincide, as in Polynesia, with better evidence than tradition.

A beardless nation with a bearded culture-institutor

The memory of the hero-god Viracocha was vividly preserved among aborigines in wide regions of the former Inca Empire, even through the last century, and in many places Viracocha stories still survive to-day among the elder natives. A good synopsis of the Viracocha-traditions is included in Brinton's monograph *American Hero-Myths.* (1882, pp. 169-202.)

Brinton (*Ibid.*, p. 192) quotes Zegarra, a leading contemporaneous Peruvian scholar, in saying: "The tradition was that Viracocha's face was extremely white and bearded." Brinton adds himself: "There is, indeed, a singular uniformity of statement in the myths. Viracocha, under any and all his surnames, is always described as white and bearded, dressed in flowing robes and of imposing mien."

"Long-Eared" Islanders in Lake Titicaca

Beyond his growth of beard and his lighter skin there was nothing strange in Viracocha's own build, yet he taught his Peruvian followers to change artificially their natural visage. Bandelier (1910, pp. 304, 305), who collected the Titicaca island legend of the expelled viracocha "gentlemen", also pointed out that in several myths Viracocha himself was remembered as the chief of a "large-eared" people that were the first inhabitants of Titicaca Island. These Islanders called themselves *Ringrim*, signifying "ear", since their ears were perforated and a heavy nugget inserted to enlarge the aperture. Tradition states that this "large-eared" people was instructed by Viracocha in building stone edifices and fortresses, including the megalithic constructions of the "House of the Sun". The Titicaca islanders, as Bandelier told us, preserved the tradition that the children of the early light-skinned men, by the native women, grew up to become the Inga-Ré or Incas. In relating how Titicaca Island was associated with the origin of the Incas, Oliva (1631, p. 37) relates an Inca tradition to the effect that "they pierced their ears and placed in them large rings of a kind of reed called totora, and subsequently enlarged these rings enormously."[1]

Montell (1929, p. 217), citing Oliva and other sources, mentions that the Incas forbade their subjects to enlarge their ears to the same extent as their own. He shows that the reason for Inca ear-enlarging is unknown beyond its traditional and apparently magical nature. The fact that subsequent Inca generations had to go through the ear-piercing and enlarging ceremonies at the principal solar festivals (Capac Raymi) "must go to show that the occasion was looked upon as being a highly important one."

Markham (1911, p. 67) says: "The custom of boring their ears and enlarging the lobes until they were a great length, which prevailed with the Incas, their relations, and the ten ayllus, obtained for them the name of Hatunrincriyoc, or great-eared people, which the Spaniards turned into Orejones." (See also Cieza, 1553—60, Chap. VII, p. 24.)

Pedro Pizarro (1571 b, p. 275), who arrived in Peru with his cousin Francisco during the conquest, wrote: "There were some orejones who had ears so large that they came down to the shoulders. He who had the largest ears was held to be the finest gentleman among them."

We recall how Easter Island traditions insist that there were "long-ears" among their ancestors when they arrived from the scorched land to the east, that is to say, from the direction of the contemporaneous Tiahuanaco Empire. We may therefore, in the following extract from Betanzos, observe that Con-Tici Viracocha's last lesson to his successors in pre-Inca Peru—before he departed into the Pacific—was the art of enlarging their ear-lobes, thus to remain "long-ears" after he had gone.

Tiahuanaco—cult centre of the Viracocha-people

Juan de Betanzos (1551) had an unusually good opportunity of collecting and preserving the aboriginal Peruvian beliefs and traditions. He came to the Inca Empire when it was first discovered and conquered, and he married a local Indian girl, so that he was in intimate contact with the natives, among whom he stayed for the rest of his life. Like nearly all the other early chroniclers he pays much attention to the Peruvian accounts of the pre-Inca culture-bearer Viracocha, or Con Tici Huiracocha.

Betanzos (*Ibid.*, Chap. I) wrote: "In ancient time, they say, the country and province of Peru was in darkness, having never light or day. There were, at the time, certain people in it, which people had a certain chief who commanded them and to whom they were subjected. Of the name of the people and the chief who commanded them they have no recollection. And in those times, when all was night in this land, they say, that from a lake in this country of Peru, in the province of Collasuyo, there came a chief called Con Ticci Viracocha who, they say, had with him a certain number of people, which number they do not recollect. And after he had sallied from this lake he went from there to a site that is close to this lake, where to-day is a village called Tiahuanaco, in the aforesaid province of the Collao. And as he went thither, he and his own, forthwith there improvisedly, they say, that he made the sun and day, and ordered the sun to move in the course it now moves and afterwards, they say, he made the stars and the moon."

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[1] Bandelier (1904, p. 200) also quotes Oviedo, who said of Cuzco: "To this land there came in ancient times, a great lord with a people they call Inga, and now they call themselves Big Ears, and only the Supreme Lord they call Inga..." Imbelloni (1926 b, p. 339) compares the old Quechua word *Inga* with the Maori term *Inga* meaning "soldier", "warrior"; and also with the Maori term *Inga-nui*, literally "Great-Inga", which means "god", "spirit". In Fidji *singa* is the word for the "sun".

The lake referred to can only be Titicaca, where Viracocha, according to most Inca accounts, began his religious activities. We recognize how native Peruvian superstition in this legend strives to associate some important event in the history of the sacred Inca with the people's own religious conceptions. It would appear that an historic hierarch with a solar cult had established himself in Tiahuanaco with his religious followers—identifying himself—like the subsequent Incas—with the earhtly representative of the supreme god. From archaeological research we know well enough today that Tiahuanaco was no ordinary village, but the religious centre of one of the most important pre-Inca hierarchies. The possibility that Viracocha was an hereditary title common to the supreme god and his principal representative on earth, is apparent when we learn through Betanzos (*Ibid.*) that Viracocha only "returned" to earth when he moved with his followers from the shores of Titicaca to the nearby site of Tiahuanaco. Long before this appearance he had, according to Betanzos' informants, created heaven and earth and the original population of the country who dwelt in darkness until he came and established himself in human shape at Tiahuanaco.

Betanzos (Chap. II) says: "...when I asked the Indians what shape this Viracocha had when their ancestors had thus seem him, they said that according to the information they possessed, he was a tall man with a white vestment that reached to his feet, and that this vestment had a girdle; and that he carried his hair short with a tonsure on the head in the manner of a priest; and that he walked solemnly, and that he carried in his hands a certain thing which to-day seems to remind them of the breviary that the priests carry in their hands. And this is the account I received on this subject, according to what the Indians told me. And when I asked them what this person called himself...they told me that his name was Con Ticci Viracocha Pachayachachic, which in their language means God, Maker of the World."

The Viracocha hierarchy and Tiahuanaco stone statues

Betanzos goes into great detail about Viracocha's activities when he reigned in Tiahuanaco before the first Incas came. We learn from his early narrative that Viracocha began his religious activity in Tiahuanaco as a sculptor of stone. From stone he made human statues as models for the new people he was to create. He sculptured a certain number of men and a chief who was to govern them, as well as several pregnant women and other women who already had children. When these stone statues were finished he had them moved to other places; whereupon he created a community in Tiahuanaco also by carving them from stone in the same manner.

It is noteworthy that according to the legend, Viracocha created man in his cult site at Tiahuanaco *at a time when a more primitive local population already existed in Peru;* but, all according to the same legend, this former people were said to have lived in darkness and ignorance. It is apparent that the account of Con Tici Viracocha and his disciples making man by carving and moving statues, is either a version evolved by the subsequent Inca to account for the images in the cult centre at Tiahuanaco—where they are still to be seen (see Frontispiece, Plates XLI, XLV, IL, LII)—or, what is even more probable, that the Tiahuanaco statues were actually built by a priest-king or hierarchy for a magical purpose, to impress the contemporaneous aborigines with their own supernatural powers and activities. The latter explanation seems the nearest to hand and most logical.

When Con Tici Viracocha's sculpturing at Tiahuanaco was finished, he is said, Betanzos tells us, to have ordered his own original followers (the viracochas who had originally accompanied him to Tiahuanaco and whose number was not remembered) all to go away except two, who were to remain with him. He first told his departing viracochas that they were to observe the Tiahuanaco stone statues and the names he gave to each kind. Pointing to the statues he said: "These should be called so and so and should appear from such-and-such spring in this or that district and should inhabit it and multiply there; and these others should appear in such-and-such cave and should be termed so-and-so and settle there and there; and such as I have pictured them and made them in stone they should appear alive from the springs and rivers, caves and mountains in the provinces which I have told you; and afterwards you should all go in that direction—whereby he pointed to the direction where the sun rises—and spread them out separately, showing them the road each of them is to take."

In his next chapter, Betanzos narrates: "As stated the huiracochas set out and walked through the districts which Viracocha had pointed out, and wherever they went they called, in the district where they were, for the people whom Viracocha in Tiahuanaco had pointed out on the stone statues that were to appear in that place. This was done by each and one of the viracochas by standing in the neighbourhood of the place where he was told that the people should appear, and there the viracocha called out: —So and so, come forth and people this earth which is waste, because that is the order of Con Ticci Viracocha, he who created the earth!—And as they called on the people in this manner, these appeared in the districts and places told by Viracocha. And it is said that they proceeded in this manner, calling and bringing forth people from caves, rivers, springs and the high mountains, as said in the previous chapter, and that they peopled the country in the direction where the sun rises. And when Con Ticci Viracocha had accomplished this and in the manner already stated, even the two who remained in Tiahuanaco are said to have been sent out by him to call and bring forth people in the said manner; whereupon he separated them as follows: He sent the one to the province Condesuyu [=Cuntisuyu], that is to the left when one is standing in Tiahuanaco with the back towards the sun-rise, that he in the same manner as the others should call forth the native Indians in the province of Condesuyu; correspondingly he sent the other to the province Andesuyu [=Antisuyu], which lies to the right if one, as said above, turns the back towards the sunrise. And after these two had been sent out, it is said that he himself also started out along the road leading to Cuzco, which lies between the two provinces, and he proceeded along the main road, which leads over the mountains to Caxamalca [=Cajamarca]; along this road he walked and called and brought forth people in the said manner. He arrived at a province called Cacha which belongs to the Canas-Indians and lies 18 leguas from Cuzco, and in this area he called forth the Canas-Indians. When these appeared, they were armed, and when they saw Viracocha and did not recognize him, it is said that they came against him in a crowd to kill him, and when he saw them coming and realized why, he caused fire to fall from the skies and begin burning a hill near the place where the Indians were. And when the Indians saw the fire and were afraid to be burnt up, they dropped their weapons and ran forth to Viracocha, throwing themselves on the ground before him. When he saw this, he took a staff in his hands and went forth to the fire and gave it some blows with the staff until the fire was put out. When this was all over he spoke to the Indians and told them he was their creator. On the spot where he had placed himself to let the fire fall from the skies and from where it would have spread to destroy the Canas-Indians, these built later a marvellous *huaca*, in wich they and their descendants offered great quantities of gold and silver and where was raised a statue carved from a great stone almost five varas (about 12 ft) tall and 1 ½ varas broad or a little less. This they did in memory of Viracocha and what had happened at this place; they say that they have carried it on from that past time until this day."

We shall later see that this statue of Viracocha in the *huaca* at Cacha was still intact at the time of the Conquest, and that the Spanish discoverers found that the large stone image "represented a man of good stature, with a long beard measuring more than a palmo..." (Garcilasso 1609 b, p. 70.) The temple and statue was later deliberately destroyed by the pious Spanish clergy.

The Viracocha-people unite in the north to start "walking" into the Pacific

Before Betanzos follows Viracocha on his final march along the ancient mountain road northwards from Tiahuanaco, he says that he had himself visited the said temple and the burnt hillock, where the account of Viracocha's journey through this district had been told him by the eldest and most important of the Indians whom he had summoned from the neighbouring village. Betanzos then follows the principal of the "viracochas" on his further move:

"To return to our narrative, it is said that he, having accomplished this wonder in Cacha, continued his road carrying out his activities as before said, and as he arrived in a place which is now called Tambo de Urcos, and which lies six leagus from Cuzco, he proceeded up on to a high mountain and sat down on the summit, where he is said to have ordered the native Indians who now live there to appear from the mountain side. And because Viracocha sat there, a rich and marvellous *huaca* was erected on this spot, in which—since Viracocha had seated himself in this place—those who built this *huaca* placed a bench of gold, and the statue which represented Viracocha was set on this bench; the gold statue represented sixteen or eighteen thousand pesos at the division made between the Spaniards in Cuzco when they had captured the city. And from there Viracocha went on and continued, while making his people as already described, until he arrived in Cuzco. Upon his arrival there he is said to have made a chief whom he called Alcaviza, and he also named this place Cuzco. And upon leaving orders as to how they should produce the *orejones* [long-ears] when he was gone, he continued further, while doing his works. And when he arrived in the province of Puerto Viejo [on the Pacific coast of the present republic of Ecuador], he joined up in that place with his own people whom he had sent out beforehand in the manner I have described earlier. As they assembled in that place, he placed himself on the ocean together with them, wherefore it is said that he and his own people went on the water just as if they were walking on land. I could have written much more about Viracocha according to what these Indians have informed me of, but to avoid being tedious, and to avoid serious heathenism and inhumanity, I have not included it."

Obviously there is a kernel of history within these geographically continuous and vivid memories of Con Tici Viracocha and his many "viracocha" subjects or disciples, who first moved south from Titicaca Island to their hierarchic abode at Tiahuanaco, and finally northwards through Peru by way of Cacha, Tambo de Urcos, Cuzco, and down to the Pacific coast of Ecuador at Puerto Viejo, all before the beginnings of Inca genealogy. It is clear that the Aymara and the Quechua Indians, whose early ancestors must have known Tiahuanaco at the time of its habitation, have in these detailed accounts memorized some episode connected with the final desertion of the hierarchic site, with the departure of its priest-king and his viracocha family or followers. There is little to be added about their mysterious man-making activities until we later consider the Tiahuanaco monoliths and human stone busts of pre-Inca origin left in various places in the Titicaca basin and on the Andean plateau. But we may note that the assembling of the viracochas, who had all deserted Tiahuanaco to unite on the Pacific Coast in the northern province of Puerto Viejo, coincides with the best locality for South American navigation and boat construction. The local craft of Puerto Viejo and its vicinity were the balsa rafts described later, and the sight of men moving about a balsa raft at sea will, to those on the shore, most emphatically leave the impression that the crew actually wade about unsupported, knee deep or even further than the waist in the waves. In reality they may not even wet their feet, but the view of the low-lying logs is blocked by rows of alternating waves even in a slightly chopped sea.

There are no later memories of these pre-Spanish viracochas except that they left in one party from this northern part of the subsequent Inca Empire. This is stated by Betanzos in his own captions to the chapter cited, which run as follows:

"How the people of this land were brought forth on the command of Viracocha, and as regards those viracochas which he sent out in this errand; and how Con Ticci Viracocha set out in the same manner, and about the two who stayed with him to carry out the same work; and how, upon finishing all this, he assembled with his own people and went out on the ocean never again to be seen."

The identity of the creator-gods Tici of Peru and Tiki of Polynesia

It is permissible momentarily to interrupt the survey of the Inca accounts of the viracochas and their chief with the prefix, title or personal name, Con-Tici, and see if their disappearance into the Pacific can be found also in Polynesian myths and traditions on the islands in the adjacent ocean. In doing so, we may first note the following limitation by

Means (1931, p. 422): "The Creator-god most celebrated in the Chronicles of Peru is known under various names which are definitely associated with the Tiahuanaco II period. He has generally been referred to as Viracocha or as Pacha-Camac, the former designation being used in the highlands, the latter on the coast. Both of them, however, are Quechua and, consequently, more or less late in date. It seems clear enough that pre-Incaic names for the Creator-god were Con, Con-Tici, Illa-Tici, and sundry approximations thereto, sometimes prefixed to the name Viracocha in later times..."

Since the Quechua is the modern Peruvian tongue spoken and introduced by the Inca, it would be fruitless on chronological grounds to try to trace the name *Viracocha* in the Polynesian island world. We shall have to consider instead his original pre-Inca names *Con*, *Con-Tici*, and *Illa-Tici* for relationship to some creator-god or royal progenitor in Polynesian mythology.

It will later be seen that *Con* was originally the full name or title of the creator and sun-god on the North Peruvian coast, while *Tici* correspondingly was the name for the same culture-hero in the Peru-Bolivian highlands. The prefix *Illa* has survived in modern Quechua as a word for "light". (Tschudi 1853 b.) Returning to a fuller discussion of the associated terms *Con* and *Illa* later (Part X), we shall here concentrate on the name *Tici* since it is most intimately associated with the pre-Inca monarch of Tiahuanaco. With the prefix *Illa* meaning "light", and *Con*, being an alternative name for the creator, we know that the early Peruvian culture-hero *Con-Tici* or *Illa-Tici* was venerated as Tici-the-Creator and Tici-the-Light.

Tici is a word of ancient origin, adopted in Quechua mythology from an earlier language, distinct from their own. It is preserved as a live word in Quechua dialects either as *tecsi* or *ticsi*, meaning "origin". (*Ibid.*) Thus Markham (1920, p. 10) says, in referring to Blas Valeras, the best informed mestizo chronicler of the sixteenth century, whose major works are unfortunately lost: "The names given for God by Valera, as used by the ancient Peruvians, are also given by some others of the best authorities. They are ILLA TICI UIRA COCHA. The first word means light. TICI is the foundation of things, or beginning."[1]

In a few cases, the early Spaniards—who had no *k* in their alphabet—have spelt the mythical name as *Ticci*, and in a manuscript by Betanzos the original spelling by him was *Titi*, later corrected to *Tici* to confirm with the general Spanish spelling. If the same European orthography had been used in rendering Peruvian names as is used in Polynesia, the name of the deity would have been rendered as *Tiksi*, *Titi*, and *Tithi*, and to the Polynesian who never have double consonants, nor the equivalent of the Spanish *c*, the name would be *Tiki*, *Titi*, or also *Ti'i*.

It is interesting, when we now turn to the Polynesian islands in the adjoining part of the ocean, to find, as Izett (1904, p. 22) shows, that: "Tiki is the name borne by a deity or demigod well known to all the people throughout the islands of Polynesia. There be those who hold that the original creation of man owns Tiki for its authorship, whilst others—no less confident, it is proper to state—affirm that Tiki occupies no higher position than that of the first man created."

Stolpe (1891, p. 206), in an attempt to analyze the implications of the Tiki traditions throughout Polynesia, writes: "In Rarotonga, Tahiti, and New Zealand he is considered to have been *the first man.* He is the prototype of a great group of divine beings, all of whom have been ordinary men who have after death been promoted to be gods of a lower rank than the previously mentioned actual gods, and who are collectively called *Atua. Tiki,* regarded as a class of gods, are thus the ancestral spirits, to which are attributed divine worship. Thus they are the protecting spirits of their own descendants and are venerated with images in which they take up abode on certain occasions. Such images are found in many forms, from the colossal stone statues of Easter Island to the small portable images of polished nephrite which are worn by the Maori."

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[1] Inca Garcilasso (1609 b, Vol. II, Chap. 2) says that neither he nor the Indians knew the exact significance of the name Tici.

Métraux (1940, p. 315) tells us from Easter Island, nearest to Peru, that: "Although Makemake absorbed his personality, Tiki, the first man or the creator of mankind, is mentioned several times in the creation chant."

In the Marquesas, Tiki is today a collective name for the local stone statues, and also for any ancestral image. Yet Tiki is at the same time the specific name of the creator and the principal man-god who was worshipped by the Marquesans' progenitors from the earliest times, long before he led them on their voyage into the Pacific.

In the Society Islands Ti'i (Ti(k)i) according to Ellis (1829, Vol I, p. 112-114) was the first king to dwell in "the world of *light.*" The same early authority states that the local natives considered Tangaroa (in Tahitian dialect Ta'aroa) and Ti'i "to be one and the same being". We recall from Tonga that this Tangaroa was the culture hero who brought man into the Pacific, and the guardian of the "white" aborigines. In Mangaia he was even considered the progenitor of all red-haired elements in the aboriginal population. Again Ellis (*Ibid.*) shows that Ti'i (*alias* Tangaroa) was the son, or grandson, of the sun and the moon, in which peculiarity he even found that he resembled the first Inca ancestor in Peru.

In one of the Hawaiian legends *Ti'i*, pronounced locally as *Ki'i*, was the first man-god who arrived in the aboriginal world contemporary with the creation of the first light, at the termination of a primeval period of profound darkness. (Buck 1938 a, p. 245.) The first king to settle and rule in Hawaii claimed Ki'i (Tiki) as his father. Fornander (1878, Vol. I, p. 168) realizes that this mythical ancestor of the first Hawaiian king coincides with the one who brought the Tahitian dynasty from the "world of light" to Tahiti. He writes: "Tahitian legends claim that one *Tii* was the first ancestor of Tahitian chiefs on Tahitian soil. ... But Hawaiian legends claim this same *Tii* or *Kii*—who was the last of the thirteen from *Wakea* that lived elsewhere than on the Hawaiian group—as the father of *Nanaulu*, with whom Hawaiian aristocracy on Hawaiian soil commences; while his brother *Ulu* remained at the south,..."

On some of the other islands, like Tokerau, the ancestorgod *Tiki* is spoken of as *Tikitiki*, which again in a great variety of Polynesian myths is used as a venerated epithet to the name of the first heroic voyager into Polynesia—the great island discoverer and mythical fisherman *Maui-Tikitiki.*

Tiki (or Tikitiki) is in Samoa pronounced Ti'i, as in the Society group, but in Tonga the name is pronounced *Kisi*, and *Maui-Kisikisi* appears in the local myths of the earliest island discoveries. (Buck 1938 a, pp. 288, 290; etc.)

When we recall that the semi-solar Tici of Peru was remembered over vast territories of the Inca Empire as an early hierarch who left Peru in pre-Inca time on an organized expedition into the East Pacific, it is certainly remarkable to find memories throughout Polynesia of a semi-solar progenitor Tiki (occasionally pronounced Ti'i, Ki'i, or Kisi) who everywhere began the earliest Polynesian island history. Buck (1949, p. 452) came to the following conclusion concerning this pan-Polynesian culture-hero: "Tiki was regarded as a definite individual, who was the first man in various parts of Polynesia, including the Society Islands (Ti'i) and Hawaii (Ki'i). The persistence of the same concept among some of the Maori tribes shows that it was carried to New Zealand from Central Polynesia."

A further comparative survey of the Peru-Polynesian creation myths concerning the activities of the earliest man-god Tici, Tiki, or Ti'i, will be made in a later part (X); here we shall only consider a few of the names associated with the Polynesian Tiki cycle, to establish beyond the range of coincidence that the Peruvian Tici worship and the Polynesian Tiki worship must have a common geographical origin.

Taranga—Taranga

Percy Smith (1922, p. 93) shows how the Tokerau islanders have a tradition that their island was "fished up out of the ocean" by Tikitiki and *Taranga*. Turner (1861, p. 253) shows that in Samoa Ti'i-ti'i (Tiki-tiki) was a "son" of Taranga (Talanga). Percy Smith (*Ibid.*) shows further that this mythical island fisherman Tikitiki was identical with the general Polynesian island-fisherman Maui, whose full Maori name is Maui-tikitiki-a-Taranga, or Maui-tikitiki of Taranga, "the latter being his mother." Fornander also (1878, Vol. I, p. 199) points to the close connection between the names Tiki and Taranga, showing that Maui-tiki-tiki was the youngest son of the family of Taranga, according to a tradition "found upon all those groups in slightly different versions."[1]

This again is interesting, because *Taranga* was the name of one of the earliest aboriginal tribes inhabiting the shores of Lake Titicaca (Posnansky 1914, p. 42; etc.) in the vicinity of Tici's centre of creation at Tiahuanaco. Together with the Uru-Indians, who inhabit the east banks of the river Desaguadero, the Taranga-people happens to be one of the oldest and most important tribes just in the area near Lake Titicaca where Tiahuanaco is located, and many places in the vicinity are named after Taranga.

Uru—Uru

We cannot mention the *Taranga* of the Titicaca basin without including a word on the *Uru*, whose traditions connect their ancestors with the building period of Tiahuanaco, or rather *Chucara*, which was the pre-Inca name of the present ruined site. Posnansky (1914, p. 91) shows that, according to Uru traditions, some of their forefathers had been buried as living sacrifices under the edifices of Tiahuanaco during its construction, an indication of the antiquity of this people in the neighbourhood.

Montell (1929, p. 8) says of the prehistoric inhabitants near the southern borders of

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[1] Buck (1938 a, p. 288) shows that Samoan myths give Talanga as Maui-ti'iti'i's "father", whereas New Zealand myths give Taranga as Maui-tikitiki's "mother". The latter conception seems to be the more general one in Polynesia. This slight uncertainty as to Taranga's sex also indicates that the name is an allegorical reference to a family or tribe rather than to an individual ancestor.

Peru: "With this primitive culture of the ancient fisher peoples of the Arica regions it is usual to associate the Urus, a tribe whose remnants are still living on Rio Desaguadero. These Indians constitute the meagre residue of a population which was formerly widely distributed. In them Uhle sees the descendants of the aboriginal dwellers on the Bolivian highlands. Uhle has made a research of the place-names and thus formed the conclusion that the Urus once inhabited even the coastland as far as Cotaguita and the upper portion of the Rio Loa Valley, and in the north extended up to Lake Titicaca, and in the northwest to Nasca. In the opinion of Boman, they occupied the entire southern part of the Peruvian coastland, nor does this seem at all improbable."

In Polynesia, we find that the name Uru (also Ulu, according to dialect), is remembered as that of a principal people either living in—or else bordering on—the ancestral abode of the creator Tiki and the island-fisherman Maui-tiki-tiki with his maternal Taranga family. We have just seen with Hawaiian legend that Uru (Ulu) was the one of Tiki's (Ki'i's) "sons" who remained behind in Tiki's original land, when Tiki's other "son" emigrated to establish the first dynasty in Hawaii.

Best (1923 b, p. 12) wrote: "We now come to two highly interesting names connected with the origin of the Maori, namely, those of Uru and Irihia. The East Coast natives of our North Island have preserved the following tradition of the original homeland. In remote times the ancestors of the Maori dwelt in the lands of Uru and of Irihia, two distinct regions of, apparently, an extensive land." He shows (*Ibid.*, p. 14) that the same early reference to Uru is preserved also in other sections of Polynesia: "The Hawaiian Polynesians have preserved a tradition of a land or region called Ulu-nui that lay adjacent to the old home of their ancestors. In our New Zealand dialect this name would appear as Uru-nui (Great Uru)."

Searching westwards of Polynesia for a name corresponding to the Uru of Polynesian memories, Best, like Fornander, Fenton, Percy Smith, Perry, and many others, shows the necessity of going as far as to Asia Minor to find an analogy. He says (*Ibid.*, p. 14): "In the southern part of Sumeria, near the mouth of the Euphrates river, as then situated, existed about 2800 B. C. the flourishing state of Uru, known as Ur of the Chaldees to readers of the Scriptures."

The fact that the early Uru nation of Pacific South America was contemporaneous with Tici, the legendary founder of Tiahuanaco, and that their habitat is considered to have formerly extended from that vicinity right down to the coast at Arica and the eastern margin of the open Polynesian ocean, cannot but be worth serious attention if a number of prominent Polynesianists, including a careful observer like Best, find it worth while to compare Ur of Sumeria with the Uru of Polynesian memories. Sumeria and Polynesia are just about antipodes, whereas Polynesia is at the doorstep of Peru, and at the time of its primeval discovery was daily washed by wind and water from a locally important Uru, one that matches Polynesian memories better than Ur of Sumeria not only in mythology and locality, but also in chronology.[1]

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[1] Besides Uru, Best (*Ibid.*) mentioned another "highly interesting" name associated with the origin of the Maori, namely *Iribia.* Like many others he suspects Irihia to be a Polynesian reference to 'India', the 'nd' being alien to Maori tongue and thus distorted to 'rih'. It does not seem convincing to me that stray boat-loads of Polynesian voyagers should carry along Ur and India as two comparable names picked up on a voyage around the world. Let

Chucara—Tutara

Tiahuanaco is a name of late origin applied to the present ruined site (see further Part X), and was not the original name either of the cult-site or of its empire. The early Jesuit, Anello Oliva (1631), who came to Peru about 1597, wrote of his visit to Tiahuanaco: "And we passed to the area of Tyyay Vanacu [Tia Huanaco] to look at its edifices, which in ancient times were called Chucara, the antiquity of which no one can determine."

Gonzales de la Rosa also (1910, p. 411) wrote about the same pre-Inca site: "In exchange then, we know that the town does not have a Quechua name, inasmuch as it is called *Chucara*, which means House of the Sun, according to the Urus, as *Bertonio* says, instead of the Quechua Intiphuasi. We know furthermore that the Urus are the aboriginals inhabiting the islands of Titicaca, who more than probably were dependent on Tiahuanaco, and spoke the same language, which has not much to do with Quechua, since it resembles more the languages of the eastern forests."

Now, Chucara would in Polynesian pronunciation become Kukara or Tutara, and, Makea-Tutara is a well known mythical name in Polynesian religious parables and allegories, where the prefix Makea is known as a separate name of ancestral gods originated by "Light" in prehuman times. Thus in his *Maori Lore* Izett (1904, p. 43) says about Maui, whose full name is Maui-tiki-tiki: "...he is alleged to have been the actual leader of the Maori people in their original entry into the Pacific ... The people of New Zealand and the Hervey Group are the chief repositories of the legends of Maui, who was the son of Makeatutara by Taranga, his birth being miraculous."

Having regard to the common Polynesian passion for embodying sacred knowledge of historic events in allegory, we may note that, as stated above, the "mother" of the legendary Polynesian discoverer was Taranga, the "father" being a particular Makea surnamed Tutara. With the two names Taranga and Tutara reappearing in early Tiahuanaco respectively as Taranga (a local aboriginal tribe) and Chucara (the early name of Tici's home), it would be natural to interpret the allusion to Maui-tiki-tiki's miraculous birth as a reference to an intermixture of the white men from Chucara and women of the surrounding Taranga tribe.

Hilo—Hilo

The distance from Chucara, alias Tiahuanaco, down to the Pacific seashore is not impressive when we consider that the Spaniards, immediately upon their arrival, repeatedly covered the distance in both directions; and, as stated, the Tiahuanaco Empire spread its influence right down to the ocean and along extensive stretches of the coast. There is only

us note instead, as does Means (1920 a, p. 27), that the name *Iraya* is preserved in the myths of central Peru, where it appears directly as an old name or title for Viracocha, *alias* Tici.

On the other hand Irihia is in Polynesian dialects identical with Ilihia (r = l), and whatever may be the source connection, and there probably is one, Ilihia is the natural Polynesian pronounciation of the Quechua name *Illa* (pronounced Illia or Ilhia), which, as we have seen, has survived in Quechua Peru as an alternative prefix to the name of Tici. (As is well known, the Spanish 'll' in Illa cannot be rendered in English much more closely than the 'lli' in 'million'.) The meaning of Illa (or Ilhia) in Peru was 'Light'. We have also just seen that the Tahitians state expressly that Tiki's home-land was "the world of *light*." That the same metaphoric term was once used as a religious phrase, referring not only to Tici but also to his own heliacal abode and early Andean realm, seems more than possible, in view of Peruvian and Polynesian modes in the use of personal and geographical names and allusions.

one really good seaport on the unsheltered South Peruvian coast immediately below Tiahuanaco; this is Ilo, or Hilo, connected with ancient Tiahuanaco by good mountain tracks. The early Spaniards spelt this aboriginal Peruvian name as Ilo, without H, since the letter *h* represents a very harshly aspirated consonant in Spanish. Later, however, when the Englishmen arrived, Frezier (1717, p. 170) spent some time in this early seaport mapping the harbour and its vicinity, and he spelt the name of the port, as well as the immediately surrounding locality, with the river, as Hilo. If Polynesia's most celebrated legendary discoverer, the mythical "island-fisher" Maui-tiki-tiki, son of Taranga by Makea-Tutara and neighbour of the Urus, had any base in the Tiahuanaco Empire, then Hilo would be the direct doorway to his former home site.

We may again return to Polynesia, and quote Fornander (1878, Vol. I, p. 199): "The *Maui* legends, the *Maui* family of four brothers, and their parent *A-Kalana*, *Karana*, or *Taranga*, . . . are found upon all those groups in slightly different versions. The legend of *Maui-kiikii* or *Maui-tiki-tiki*, the youngest of the family, being out fishing, and catching the various Hawaiian islands on his hook, attempting to drag them ashore at *Hilo* and join them to Hawaii, is found nearly literally the same on New Zealand. On Tonga the same legend obtained, but they ascribe the act to *Tangaloa* instead of *Maui*."

In Hawaii, Hilo is a principal port on the east coast of the main island, but the pan-Polynesian discoverer and fisherman would not drag the various Hawaiian islands ashore on Hawaii, which also formed part of his catch. We must therefore assume that the present Hilo in Hawaii has merely been renamed, in typical Polynesian fashion, after another and primeval Hilo in Maui-tiki-tiki's aboriginal abode outside Polynesia, just as one of the Hawaiian islands, Maui, has been named after Maui himself. We have seen that such a Hilo is found as a port on the Pacific coast of Peru just below Tiahuanaco.

Mauri, Tambo-Mauri—Maui, Mauri

We now come to the personal name, Maui, of that special Tiki who plays such an important part in the allegories referring to the discoveries of Polynesia. An island in Hawaii is named in his honour, the North Island of New Zealand is by the Maori called Te Ika-a-Maui ("Maui's Fish"), and in far-flung Polynesian localities he is remembered as a hero connected with the pulling up of the first islands out of darkness and the unknown. Buck (1949, p. 5) writes: "The Maui myth of fishing up islands is widely spread throughout Polynesia. It is probable that Maui was an early navigator and explorer who lived so far back that he formed a link between the supernatural and the natural, between the gods and man. The fishing up of islands is a Polynesian figure of speech, for the discoverer of an island did fish it up out of the ocean of the unknown. The story, combined with other Maui feats, became popular and it was spread by later voyagers to regions Maui never knew."

Fornander (1878) has pointed out that the universality of the legend, "and the fact that each group has endeavoured to localise the god and his exploits on its own domain" prove that "its origin and the name of the hero must be looked for in their former habitants in the West". So far, however, an analogous name has not been discovered in the west.[1]

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[1] Except by those who proceed west even of Ur of Sumeria and make associations directly with the Mauris of North Africa.

It is noteworthy in this connection that early Polynesian navigators, when setting out on an ocean voyage, took with them, in their canoes, a stone or some other sort of talisman which they referred to as a *Mauri.* (Best, 1925 a, p. 148.) A connection between this Mauri and the first successful ocean voyager Maui cannot be proved, but is etymologically very possible. Stair (1896, p. 40) shows that Mauri is a term used in Samoa for the spiritual portion of a man, and Mauri-uri is an ancestral spirit in the modern Marquesas Group. (Heyerdahl 1938, p. 150.)

Since the Tiahuanaco cult site has long been abandoned by its occupants, we have to study local names for places and individuals through their successors in the Andes. Thus it is not so surprising that an obviously personal name like Maui was less likely to survive in later Aymara and Quechua traditions than the name of an ancient cult site and port (Chucara and Hilo), or of ancient tribes and people (Taranga and Uru), or of a mythical local creator and his hierarchy (Tici). Yet, although the early dwellers of the Tiahuanaco district left no written records behind, they named villages, rivers, and mountains near Tiahuanaco with their own favourite names, many of which have survived till the present day. Recalling how Tici "created" and named his people by making them emerge from caves and rivers in the neighbourhood, it may be of some significance to note that Mauri and Tambo-Mauri are two village sites on the way from Tiahuanaco to the Pacific Ocean, while Mauri is also the name of the principal tributary of the Rio Desaguadero, flowing from the Pacific sierras through former Uru lands just south of Tiahuanaco.

Maui-ti'i-ti'i and Tici both solar representatives among their subjects

With this striking convergence in one restricted area around Tiahuanaco of the principal names intimately connected with the legendary discovery of Polynesia, we may well suspect that there is some source connection with that Tici family, the legendary emigrants from Tiahuanaco, who, according to surviving memories of the adjoining Inca Empire, departed into the open Pacific in early pre-Inca time.

For a further identification of the Polynesian discoverer with the emigrant Tiahuanaco Sun-priest or solar hierarch Tici-the-Light, we may note that the Society islanders give Maui's name as *Maui-ti'i-ti'i-o-te-ra* or "Maui-tiki-tiki-of-the-sun", and that of Maui's father as *Hihi-ra*, or "Ray-of-the-sun". (Luomala 1940, p. 36.) We have already seen with Ellis that the royal families of Tahiti also claim direct descent from the sun through the first man-god *Ti'i* (Tiki), who was son or grandson of this heavenly luminary. It seems obvious that the universal references to Tiki's name and existence throughout Polynesia are a good criterion of his former existence as an actual personality, rather than a fictitious being. They prove at least that his name and worship were common to some of the Polynesian ancestry before they spread over their respective islands. Tiki is not remembered in Indonesia or other parts of the far West Pacific, either as name or title, and still less as the creator and descendant of the sun, the first of all recorded kings, and chief migrant into the East Pacific adjacent to Polynesian waters. But in early Peru he is remembered from pre-Inca days with all of these characteristics, and over a widespread continental area, from his home among Taranga, Uru, and Mauri tribes near Lake Titicaca to his final departure from the coast at Puerto Viejo below the equator. We are either confronted with East Pacific memories of one individual hierarch named Tiki, or remnants of a whole ecclesiastical lineage of that name. In any case the concurrence of the names and qualities associated with the legendary hero who emigrated from Peru with his light-skinned followers, and those with the same fair complexion who discovered Polynesia, is not to be explained by mere coincidence, nor as a parallel linguistic evolution due to the like tendencies of the human mind.

Large-ears left Peru and Long-ears reached Easter Island

No more is it a coincidence that people in wide areas of aboriginal Peru began to enlarge their ears to an enormous size upon the order of this same pre-Inca cult-leader, whilst the first legendary king of Easter Island brought just such long-eared people with him from the east. We are not restricted to the Easter Island traditions and stone monuments for verification of the claim that this practice existed locally, for the custom apparently survived with the women and children who were said to have been spared upon the destruction of the earlier "long-ears". Thus Behrens (1737, p. 136), who accompanied Roggeween when he discovered this island, wrote that there were among the Easter Islanders "a few of a reddish tint as if somewhat severely tanned by the sun. Their ears were so long that they hung down as far as to the shoulders."

And when Beechey (1831, p. 38) made his call, he recorded that: "Both sexes still retain the hideous practice of perforating the lobes of the ears, though the custom is not so general with the men as formerly. The aperture, when distended, which is done by a leaf rolled up and forced through it, is about an inch and a quarter in diameter. The lobe, deprived of its ear-ring, hangs dangling against the neck, and has a very disagreeable appearance, particularly when wet. It is sometimes so long as to be greatly in the way; to obviate which, they pass the lobe over the upper part of the ear, or more rarely, fasten one lobe to the other, at the back of the head."

The custom of lengthening the ears had spread with the Pacific immigrants and survived on some of the other islands, including the Marquesas Group. In Uapou Island of this group, Tiki was worshipped under the specific name of *Tiki Puaikanui*, that is: "Tiki with large ears." (Tautain 1897, p. 674.) Likewise, as Allen (1884, p. 250) points out: "Cook found the Hervey Islanders (north of Rarotonga) to have long beards and enlarged ears; they had a god 'Big Ears'."

The custom of ear-stretching is found in many parts of the world, among certain African tribes, among the Dajaks, and in early Nias, and its occurrence in Polynesia and sections of adjoining Melanesia is therefore in itself no argument for a necessary origin of the custom among the long-ears of Peru. However, when the Easter Islanders in the extreme east of Oceania declare that the custom was not of local origin since 'long-ears' were found in Hotu Matua's party from the desert land to the east, and when the Peruvians on the western shores of South America affirm no less confidently that Tici, the teacher and chief of all pre-Inca 'long-ears', emigrated westwards by sea with his followers, we have reason to suspect some underlying connection.

Sarmiento's account of Ticci Viracocha and his departure

As we proceed in our review of South American traditions and beliefs, we have allowed ourselves this little digression back to the islands merely to show that Polynesia is not completely alien to the subject on hand.

Returning to ancient Peruvian traditions from pre-Inca times, we find the main features of Betanzos' narrative borne out by other early chroniclers. Sarmiento de Gamboa (1572, p. 32), who took great interest in the various accounts given by the trained Inca quipucamayocs and historians, and who consulted the foremost of them before publishing his *History of the Incas*, gave much the same account as Betanzos.

Sarmiento tells us how the Incas believed that, after the creation, Ticci Viracocha sent a great flood to punish the sins of the first men, but the ancestors of the Cuzcos and some other nations were saved and so left some descendants. When the flood was over, Viracocha suddenly appeared on the Titicaca plateau with his servants, to help restore mankind and give them light.

"With this object he went, with his servants, to a great lake in the Collao, in which there is an island called Titicaca, the meaning being 'the rock of lead', of which we shall treat in the first part. Viracocha went to this island, and presently ordered that the sun, moon, and stars should come forth, and be set in the heavens to give light to the world, and it was so. ... This done, Viracocha made a sacred idol in that place, as a place for worship and as a sign of what he had there created. Leaving the island, he passed by the lake to the mainland, taking with him the two servants who survived. He went to a place now called Tiahuanacu in the province of Collasuyu, and in this place he sculptured and designed on a great piece of stone all the nations that he intended to create. This done, he ordered his two servants to charge their memories with the names of all tribes that he had depicted, and of the valleys and provinces where they were to come forth, which were those of the whole land. He ordered that each one should go by a different road, naming the tribes, and order them all to go forth and people the country. His servants, obeying the command of Viracocha, set out on their journey and work. One went by the mountain range or chain which they call the heights over the plains of the South Sea. The other went by the heights which overlook the wonderful mountain ranges which we call the Andes, situated to the east of the said sea. By these roads they went, saying with a loud voice 'Oh you tribes and nations, hear and obey the order of Ticci Viracocha Pachayachachi, which commands you to go forth, and multiply and settle the land.' Viracocha himself did the same along the road between those taken by his two servants, naming all the tribes and places by which he passed."

Sarmiento also shows how tradition placed the erection of Tiahuanaco prior to the final departure of the viracochas: "...previous to starting, they built those edifices, the ruins of which may still be seen, before they set out. This was for the residence of Viracocha, their maker."

The quipucamayocs, describing to Sarmiento the appearance of Viracocha when he preached among their ancestors, gave much the same account as Betanzos' informants: "...all agree that Viracocha was the creator of these people. They have the tradition that he was a man of medium height, white and dressed in a white robe like an alb secured round the waist, and that he carried a staff and a book in his hands." Regular books, as known from pre-Columbian Mexico, have never been discovered in Peru, yet an unidentifiable object, the memory of which the sight of a "book" or a "breviary" might well recall to a native mind, appears carved in the hands of the pre-Incaic Tiahuanaco stone statue reproduced on Plate XLV **2**.

To return to Sarmiento's account, this light-skinned teacher left his former residence at Tiahuanaco, walking northwards through the cordilleras between the roads taken respectively by his two disciples: "... Viracocha continued his journey, working his miracles and instructing his created beings. In this way he reached the territory on the equinoctial line, where are now Puerto Viejo and Manta. Here he was joined by his servants. Intending to leave the land of Peru, he made a speech to those he had created, apprising them of the things that would happen. He told them that people would come, who would say that they were Viracocha their creator, and that they were not to believe them; but that in the time to come he would send his messengers who would protect and teach them. Having said this he went to sea with his two servants, and went travelling over the water as if it was land, without sinking. For they appeared like foam over the water and the people, therefore, gave them the name of Viracocha, which is the same as to say the grease or foam of the sea."

The white Viracocha-runa, or Sea-Foam-people

This whole tradition, including the Quechua significance and origin of the term *viracocha* for the former "white" islanders of Titicaca, was, as finally presented, supported and verified by forty-two of the most prominent and best informed historians of the Inca Empire, a procedure which was protocolled by Spanish authorities under the auspices of the Peruvian viceroy. Nevertheless, the composition of the purely Quechua word *viracocha* has in after year encouraged some weird speculations, with theories even of Sanskrit (Desjardins 1858) and Egyptian (Campbell 1875) affiliations. The significance of the term *viracocha* has otherwise been fully discussed by Brinton (1882) and Villar (1887). Quoting the historian Herrera, Brinton (1882, p. 190) says of Viracocha:

"He passed on towards the West until he reached the shore of the sea. There he spread out his mantle, and seating himself upon it, sailed away and was never seen again. For this reason, adds the chronicler, 'the name was given to him, *Viracocha*, which means Foam of the Sea, though afterwards it changed in signification.' This leads to the etymology of the name. It is confessedly obscure. The translation which Herrera gives is that generally offered by the Spanish writers, but it is not literal. The word *uira* means fat, and *cocha*, lake, sea, or other large body of water; therefore, as the genitive must be prefixed in the Qquichua tongue, the translation must be 'Lake or Sea of Fat.' This was shown by Garcilasso de la Vega, in his *Royal Commentaries*, and as he could see no sense or propriety in applying such a term as 'Lake of Grease' to the Supreme Divinity, he rejected this derivation, and contented himself by saying that the meaning of the name was totally unknown. In this Mr. Clements R. Markham, who is an authority on Peruvian matters, coincides, though acknowledging that no other meaning suggests itself. I shall not say anything about the derivations of this name from Sanskrit, or the ancient Egyptian; these are etymological amusements with which serious studies have nothing to do."

"The first and accepted derivation has been ably and to my mind successfully defended by probably the most accomplished Qquichua scholar of our age, Señor Gavino Pacheco Zegarra, who, in the introduction to his most excellent edition of the Drama of *Ollantai*, maintains that Viracocha, literally 'Lake of Fat', was a simile applied to the frothing foaming sea, and adds that as a personal name in this signification it is in entire conformity with the genius of the Qquichua tongue.

"To quote his words: — 'the tradition was that Viracocha's face was extremely white and bearded. From this his name was derived, which means, taken literally, 'Lake of Fat;' by extension, however, the word means 'Sea Foam,' as in the Qquichua language the foam is called *fat*, no doubt on account of its whiteness.' "

The tribal name 'Sea Foam' is not at all improbable as applied to a seafaring people, at least not among aboriginals in Pacific America. We need only return to the very light-skinned aborigines of the Northwest Coast tribes, to find, as Barbeau (1945, pp. 427, 428) does, that the leading local seafaring tribe was called the "Foam-people". We even learn of the roming Foam tribe that their slogan was "Our war canoe crosses the ocean", and that, according to Northwest Coast tradition: "The garments of the Foam people were much finer and more luxurious, their canoes were more complex and seaworthy, and their customs belonged to a higher culture."

We should not therefore be surprised to find that also in South America the name *Viracocha-runa*, or "Sea-Foam-people", is applied to a light-skinned people who chose an island home in the huge mountain lake of Titicaca as their first settled abode among the pre-Incas, and the balsa raft centre of Manta and Puerto Viejo for their final departure into the waves of the Pacific. Nothing would be more natural to a "red" Indian, when sighting low aboriginal craft containing mariners of lighter skin than usual in his own tribe, than to give them the tribal name "Foam-people" or "Sea Foam".

The return of an unfaithful Viracocha servant

Sarmiento's informants told him also of a less significant but dramatic episode which followed after the departure into the ocean of the chief-god Viracocha and his disciples. Ticci Viracocha, in his farewell speech before he left the coast, warned his hearers that people would come with a false Viracocha, preaching that he was their Creator, but that they were not to be believed; one day, however, he himself would send messengers back to teach and protect the people of his deserted Empire. According to Inca tradition, his warning did very soon come true, but the fake was detected by the Indians. The background for this strange episode was as follows:

While the true Viracocha still reigned at Titicaca, he had dismissed one of his own servants for disobedience, and sent him floating on a raft down the Desaguadero river connecting Lake Titicaca with Lake Poopo. The dismissed viracocha had angrily threatened that he would one day return and take vengeance on his master. Only a few years after the departure of the true Viracocha and his followers from Puerto Viejo, the same man returned and, supported by others, began to preach that he was Viracocha. Although at first the people were doubtful, they finally saw that the claim was false, and ridiculed them.

"This absurd fable of their creation is held by these barbarians and they affirm and believe it as if they had really seen it to happen and come to pass." With these words Sarmiento concludes his account of the prehistoric "white" men, who were alleged to have preceded himself and the other Spaniards in imposing culture and religion upon the red-skinned "barbarians" of early Peru. Markham (1907, p. 37), in his translation of Sarmiento, adds: "The tradition of the exercise of his creative powers by Viracocha at Lake Titicaca is derived from the more ancient people who were the builders of Tiahuanacu. Besides Sarmiento, the authors who give this Titicaca myth are Garcilasso de la Vega, Cieza de Leon, Molina, Betanzos, Yamqui Pachacuti, Polo de Ondegardo, and the anonymous Jesuit."

Pachacuti's account of the bearded Creator and his Tiahuanaco sons who left for the sea

Pachacuti-Yamqui Salcamayhua (1620, pp. 70, 73), himself a beardless Quechua Indian writer, and author of *An Account of the Antiquities of Peru*, specifically called attention to the fact that an immigrant creator with a *beard* had been active among his forefathers before the advent of the Spaniards. He relates that at a very remote period, shortly after Peru had been populated, there came from Titicaca Island to the tribes of the mainland an old man with a beard, dressed in a long robe. He went about in the highlands preaching his religious beliefs to the Indians. They called him Tonapa or Tarapaca ("eagle"), but also Uiracocha-ra-pacha yachi-pachan or Pacha-ccan, and various other names. He was first remembered as he came from Titicaca Island to Tiahuanaco, but later his activities took him all the way north through the Cordilleras until he came to Chacamarca (otherwise given as Cajamarca, in the highlands above the Pacific coast, in the extreme north of Peru). Finally: "Tonapa then followed the course of the river Chacamarca until he came to the sea."

Tonapa, alias Uiracocha-ra-pacha, is here given the very same itinerary as previously given by Betanzos, who also brought Viracocha by way of Cajamarca to the coast. Pachacuti added that Tonapa finally left by sea, according to the most ancient Inca accounts, and suggest of his own accord that he might possibly have headed for the Straits (Panama) and the other sea.

Pachacuti does not seem to consider the bearded preacher Tonapa, alias Uiracocha-rapacha, as more than a human culture-hero, distinct from the original divine creator himself, although to him also the two seem at times to be somewhat intermingled. He tells us elsewhere (p. 7) that the 'creator' had two 'sons', Ymaymana Viracocha and Tocapo Viracocha, who resided with him "at Tiahuanaco, where all mankind was created". In the end the creator had ordered the elder son, Ymaymana Viracocha, to set out from Tiahuanaco and go by the way of the mountains and forests to instruct and teach all the peoples living there. The younger son, Tocapo Viracocha, was also sent northwards, but by way of the Pacific plains, visiting the people there and instructing them. Thus they went northwards until they reached the sea, whence they disappeared from mankind for ever, the Indians believing they had returned to heaven. The reference to these two viracocha brothers is plainly a distorted version of the legend of the two selected viracocha servants met with in the earlier accounts of Betanzos and Sarmiento.

Aboriginal history; a foreign language and a foreign mind

We learn from various narratives that the "preaching", "teaching", and "instructions" of Viracocha were of a religious as well as of a practical nature. He was anxious that the Indians should consider him the representative of the sun, a divine being in spite of his human appearance, which only differed from theirs in a lighter skin and a beard, and in his attire, consisting of a long robe secured with a girdle, and the habit of carrying a staff and a book-like object in his hands.

It is interesting to note from various accounts how anxious this legendary preacher was to teach the tribes that he and his followers were god-men, connected with the sun, and that they should be worshipped and obeyed accordingly as creators, lords and protectors, instead of the idols of the former age of darkness. We are told how they taught the natives agriculture and showed them which were edible plants; how they introduced irrigation of waste land; how they built stone statues either in memory of their own ancestry who survived the flood (at Pukara), or thus to "create ancestors" for the already existing tribes (at Tiahuanaco); how they instructed their subordinates in megalithic work and other stone sculpturing; and how they made them believe in the magical power of having ears that reached to the shoulders.

We cannot look at the colossal monoliths and other cyclopean constructions left by the founders of Tiahuanaco and not realize that the Tiahuanaco dynasty was bound to survive *to some extent* in the memories of subsequent generations. Since there are no traditions of the Tiahuanaco cult and the main events of pre-Inca Peru other than those which include references to the white and bearded teachers, we should pay due attention to these stories among the local "barbarians" and try to understand them. It should be remembered that their religious beliefs were different from ours, and that their interpretation of observed facts would differ accordingly. The same could be said about their modes of expression and narration. But this does not lessen the value of what the Inca historians had to say. After all, the Inca traditions are centred round memories of prehistoric creatures with no more incredible characteristics than that they had a fair skin and a growth of beard, like our own Caucasian race. What they claim to have seen among themselves is no more fantastic in appearance than are the men with red hair, white skin, flowing beards, and long ear-lobes described by the early European discoverers on the nearest islands in the Pacific, whither the Inca historians agreed that all their sea-faring viracochas had finally retreated.

Some of the pre-Inca architectural achievements are of such proportions that they have astounded modern observers, and occasionally stimulated the weirdest theories among writers of our own day. Indeed, we can well believe that Tiahuanaco culture-bearers in action, dragging to their site from the nearest quarry miles away immense stone blocks, "some of which are twenty-five feet long, fourteen feet broad and nearly seven feet thick" (Mozans 1911, p. 190), would be a sight likely to make a vast impression, amounting to worship, and implant itself deeply in the memory of the primitive surrounding tribes.

The weight of single slabs among the largest of these carved and transported stone colossi is estimated by modern archaeologists at a hundred tons (Bennett 1946, p. 112), equal to the weight of twenty elephants. Such stupendous achievements cannot but have created veneration and superstition among people like the Aymara and Quechua Indians, even though their ancestors had seen how the culture-leaders accomplished the task simply by the skilfully organized toil of the subjugated masses. To them the hierarch of such an unusual high-culture, who had been able to convert the huge hill at Tiahuanaco into a vast stone-dressed pyramid like Akapana, must have been a god, and perhaps even their own divine creator. This semi-artificial pyramid of Tiahuanaco rises above the plain and is visible to Indians at great distances on the plateau, being more than six hundred feet square, fifty feet high, and with a summit platform of roughly three hundred thousand square feet. No less impressive are the artificial and semi-artificial adobe pyramids near the Pacific coast in north Peru, dating back to the pre-Inca (Early Chimu) times when the Viracocha was remembered as descending from Cajamarca to the coast just in this neighbourhood.

The fact that the men of this time were able to build semi-artificial pyramids as big as hills, and construct irrigational works which made water flow into desert valleys, was bound to make a lasting impression on the superstitious tribes of the country.

We may well understand that the mediaeval Spaniards would think that any worship and religious belief other than their own should be the work of the devil and of barbarous ignorance. But modern science tries to interprete rather than to condemn or ignore widespread native beliefs and legends. The Spaniards may also be excused for believing that a beard and a light skin should be post-European rather than pre-Incaic on the far side of the Atlantic, and that American history began when Columbus set foot ashore in the West Indies; but in our time we know that local evolution or foreign interbreeding had left men with light skin, beard, and even occasional reddish hair on the Pacific coast of Northwest America *before* the arrival of European ships. We know too that other men of even lighter skin, with strong beards and fair hair, made occasional visits to the opposite side of North America some twenty Quechua generations before the coming of the Spaniards to Peru. These were led by Leiv Eiríksson and his kin, who landed in Northeast America and then returned, to survive in *European* tradition until his adventures were put on written record.

American history began twenty thousand years or more before the advent of the first Spaniards or the first Vikings. In the latter epoch of this span of time, in the centuries before Columbus, great civilizations have risen and even the greatest fallen. Prolonged local isolation, or intermixture with secondary immigrants of different origin, can account for the fact that pre-Columbian America was not inhabited by "red" or copper-coloured men only, but, as stressed by Boas (1925, p. 22), and by many others with him, that the American Indian type is not by any means uniform: "The pigmentation differs from a dark brown to almost European lightness . . . the hair is not always straight and black, but may be brownish and wavy."

We need not, therefore, cross the Atlantic or any other ocean to find pre-Columbian men who would live in Inca memories as the "Sea Foam People" or white and bearded gods. Without suggesting any direct coast to coast contact, we need go no further than to the Northwest Indians to find another American area where a "Foam people" is remembered, not, in this area, as making a short visit, but as mariners who came to stay, and where the European discoverers also found aboriginal men with skins "very little darker than Europeans in general" and with "large and thick, but straight beards". (See Part II.)

Thus we have, within pre-Columbian America, all we need to appreciate the physical appearance, religious conceptions, and creative abilities of the viracochas in Inca mythology and legendary history.

Cieza's account of the white benevolent Ticciviracocha

Cieza de Leon, it will be recalled, collected the aboriginal traditions that men, white and bearded like the Spaniards themselves, had lived in Vinaque and on Titicaca Island long before the reign of the first Inca. We further find that he also was impressed by the Inca memories of Viracocha. Cieza says (1553-60, Part II, Chap. V) that, "before the rule of the Incas in these realms, and even before they were known, these Indians relate other things much older than all that has been told." Cieza's informants told him that in the earliest days, when there were only heathen idolaters in their land, the sun had first appeared among the Indians of Titicaca Island. On this occasion the sun must have created the god-like culture-bearers who now suddenly appeared as teachers among the barbarians of Peru, or else *vice versa*, for we learn through Cieza:

"And immediately after this event, they tell that from the south [of Cuzco] there came and stayed a white man of tall stature, who, in his appearance and person showed great authority and veneration, and that as they saw he had great power, turning hills into plains and plains into hills, making fountains in the solid rocks, they recognized such power in him that they called him Creator of all made things, Beginning thereof, Father of the Sun, because, besides this, they say that he made greater things, as he is said to have given men and animals their existence, and finally that wonderful benefits came from his hands. And the Indians who told me this had heard from their forbears, who had also heard it from the songs which these had had since very ancient times, that he went off northwards along the Sierras while accomplishing these wonders, and that they never saw him again. In many places they tell how he gave rules to men how they should live, and that he spoke lovingly to them with much kindness, admonishing them they should be good to each other and not do any harm or injury, but that instead they should love each other and show charity. In most places they generally call him Ticciviracocha, but in the province of Collao they call him Tuapaca, and in other places around there Arunaua. In many parts temples were built to him, in which they placed stone statues in his likeness, in front of which they made sacrifices. The large stone statues which are at the site of Tiahuanaco must be from those times. And although they relate of his former fame this which I tell of Ticciviracocha, they cannot tell more of him, neither that he returned to any part of his kingdom."

Departure by sea of Ticci surnamed Viracocha

Cieza also states: "It is furthermore said that some time later another man was seen who resembled the one described, but whose name is not mentioned." This is evidently a reference to the dismissed "white servant" of Viracocha, who came back to preach when the others had left.

The natives had heard from their forefathers that Viracocha was much beloved, because he was humane and benevolent to all, and because he cured sick people, but that when he came to the neighbourhood of Cacha the Cana-people assembled to kill him. As they approached the place where he was, they saw him kneeling with his hands stretched out towards the mountains, as if praying for divine help. Here Cieza repeats almost verbally the account of the fire which scared the Cana Indians, as already related by Betanzos, and concludes: "It is furthermore said that after he left this territory, he continued to the coast of the ocean, where he spread out his mantle and disappeared for ever among the waves. And according to the manner in which he left, he was given the name Huiracocha, that is to say Sea foam."

It is unlikely that Indians spread over a wide area would evolve conceptions of such an alien humanitarian had the idea not actually obtruded itself upon them in concrete human form. In addition, the somatological collections from the Tiahuanaco site and early pre-Inca Peru give us all the proof we need that the men behind the irrigation ditches and the megalithic sites were surgeons as well as architects. Nowhere among putatively "primitive" races did medical knowledge—with trepanning, setting of fractured bones, dentistry, and the use of exceedingly fine bandages—reach the level of these early culture-bearers. To this we shall return in a later part.

Avila's account of the Creator

Viracocha appears more human still in an early version rendered by Francisco de Avila (1608, p. 124). Here a viracocha, under the name Coniraya Uiracocha, is recalled simply as an intelligent old man associated with the construction of the irrigational terraces, walls, and channels: "They say that this was the Creator of all things; and that, by his word of command, he caused the terraces and fields to be formed on the steep sides of ravines, and the sustaining walls to rise up and support them. He also made the irrigating channels to flow, by merely hurling a hollow cane, such as we call a cane of Spain; and he went in various directions, arranging many things. His great knowledge enabled him to invent tricks and deceits touching the *huacas* and idols in the villages which he visited."

Avila adds that there was in Peru an idol called Coniraya which was invoked and reverenced under the name *Coniraya Uiracocha* almost down to the coming of the Spaniards. He is much puzzled to observe that "this name is that which they gave, and still give, to the Spaniards", but affirms: "This invocation and custom of calling the idol by the name of Uiracocha certainly prevailed long before there were any tidings of Spaniards in the country." Avila does not seem to realize that the Spaniards may have been named after the viracochas rather than vice versa.

Acosta's version of Viracocha at Tiahuanaco

Joseph de Acosta (1590 b, Vol. I, p. 71, English translation 1604) merely says of the Peruvians that their earliest memories fade back into a disastrous deluge, and that some time later "they report that out of the great Lake Titicaca came one Viracocha, which staied in Tiahuanaco, where at this day there is to be seene the ruines of ancient and very strange buildings, and from thence came to Cuzco, and so began mankinde to multiply."

Andagoya's account of the founder of Cuzco, white and bearded

Pascual de Andagoya (1541—1546, p. 55), whose explorations from Panama led to Pizarro's discovery of Peru, and who was in intimate contact with all the Spanish explorers and voyagers who took part in the subsequent Conquest, wrote: "The first lord, of whom there was any recollection in Cuzco, was the Inga Viracoche. This was a man who came to that land alone; but there is no record of whence he came, except that Viracoche, in the language of the people, means 'Foam of the sea.' He was a white and bearded man, like a Spaniard. The natives of Cuzco, seeing his great valour, took it for something divine, and received him as their chief. He ordained many excellent laws and regulations for the government of the land; built the edifices of Cuzco and the fortress, which is made in a wonderful manner."

The Viracochas and the Inca line

The title of 'Inga', prefixed above to the name of Viracocha, may be the result of the later Incas' attempt to establish their descent from these celebrated viracocha deities and thereby strengthen their own position as children of the sun. On the other hand Andagoya may not have distinguished between the original bearded culture-hero Viracocha, who came alone to Cuzco en route from Tiahuanaco to the sea, and a much later Inca Viracocha or Uira-ccocha Ynca, a ruler in the middle of the Inca dynasty who was given this honorary name probably because, like the later Spaniards, he resembled the original viracochas in having a growth of beard: "The prince is said to have had hair on his face, while the Indians are usually beardless," says the Inca historian Garcilasso de la Vega (1609 b, Part II, Chap. 45) of this late Inca Viracocha to whom he was himself related on his mother's side. He adds that the Spaniards were termed "Uira-ccocha" like this emperor, because they too wore beards, and because they, like Viracocha, wore clothes right to the feet, whereas the usual Indian custom was to be dressed only down to the knees.

Cieza (1553—60, Part II, Chap. 38) also at first mistook the references to the late Inca Viracocha for those pertaining to the original Ticciviracocha, and believed the said Inca to have come from other parts, until he was informed by the learned men at Cuzco that the *Inca* of that name "was born in Cuzco and grew up there like his parents and ancestors, the name Viracocha being applied to him only as a personal name of the kind everybody has."

Fernando Montesinos (1642, p. 52), partly using important source material from Blas Valeras, says that in imitation of the first and original Viracocha (Huira Cocha, or Huarma Huira Cocha), many early Peruvian gods and idols were named Viracocha, and also some royal children. But the early king Capac Raymi Amanta commanded that henceforth the name should be given only to "the great and ancient god whom his ancestors had been wont to adore". Subsequently only one of the most prominent Incas (*Ibid.*, p. 97) was permitted during manhood to adopt the name of the early creator Viracocha.

A search through the early Spanish literature concerning the origin of the Inca leaves no doubt that the latter endeavoured to connect their genealogy directly to that of the culture-hero Viracocha and the light-skinned bearded islanders, all of whom are associated with a primeval focusing centre on Titicaca Island in the lake of the same name. We know of the Titicaca Island traditions[1] that the Inga-Ré, as 'mestizos' sprung of the 'caballeros' and the native island women, became the ancestors of the royal Inca line. And all through Inca accounts we find a deliberate effort to join the Inca ancestry to that of Viracocha and the Sun, often even to amalgamate the lines to the benefit of the Incas, who would thus themselves take the credit of being the originators of Andean civilization, and direct and unpolluted descendants from their father the Sun. That the Incas rose to power by playing on the primitive conceptions and superstition of the masses, and through sheer imitation of their forerunners, has been well known at least to the members of the Inca family themselves, and the fact seems even to have been suspected to some extent among the broad masses of the people.

Garcilasso's legend of savages suddenly given culture

Inca Garcilasso de la Vega, whose purpose it was to establish his mother's Inca family as a culture-people not inferior to that of Spain and as the true founder of civilization in South America, gives little credit to the earlier pre-Inca civilizations. But he openly admits that the Incas established their hierarchy through fraud and by exploiting the earlier Peruvian beliefs that the sun had first appeared among the natives on Titicaca Island. Since he does not mentiont he existence of any pre-Inca high-culture, but gives all the honour to his own rather recent Inca kin, we may safely deduce that his account of the introduction of civilization into aboriginal Peru can have historic value only if we treat his reference to the first *Inca* culture-spreaders as a reference to the first *Peruvian* culture-spreaders.

Garcilasso (1609 b, Part III, p. 62) had his information from Incas of royal blood, and he tells us himself how he acquired his account of the rise of the Incas: "So days, months, and years passed away, until I was sixteen or seventeen years old. At that time it happened that, one day when my relations were engaged in these discourses, talking of their royal ancestors, I said to the most aged of them, who usually related the stories of his family—'Ynca my uncle, you have no writings which preserve the memory of past events; but what accounts have you of the origin of our kings?...' "

"The Ynca, as soon as he had heard my questions, was delighted to have the opportunity of replying to them; and I, though I had heard his stories many times before, never listened with so much attention as on that occasion. He turned to me and said, 'Nephew, I will tell you what you ask with great pleasure, and you should preserve what I have to say in your heart', which is their phrase, instead of saying in the memory. 'Know then that in ancient times, all this region which you see was covered with forests and thickets, and the people lived like wild beasts without religion, or government, or town, or houses, without cultivating the land, or clothing their bodies, for they knew not how to weave cotton nor wool to make clothes. They lived two or three together in caves or clefts of the rocks, or in caverns underground. They ate the herbs of the field and roots or fruit like wild animals, and also human flesh. They covered their bodies with leaves and the bark of trees, or with the skins of animals. In fine they lived like deer or other game, and even in their intercourse with women they were like brutes; for they knew nothing of living with separate wives.' "

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[1] As stated, the original occupants of Titicaca Island, both Quechua and Aymará, moved over to the main shore of Lake Titicaca for a few decades after the Spanish conquest, but the oral traditions and memories again followed the natives back to the island.

It seems rather obvious that such a vivid and descriptive memory of primitive life in the Andes could never have survived had these barbarous individuals themselves been the founders of Andean civilization through the slow and enduring process of cultural evolution. The mere existence of such a legend among the Inca goes to prove that we are dealing with the memories of cultured people who have seen savage life in the Andes as a contrast to their own. Yet we know that the first *Inca* did not find the people of the Andes without religion, government, agriculture, and architecture. These things were due to their highly cultured predecessors, the spreaders of Andean civilizations like early Tiahuanaco, Pucara, and Chavín. The spreaders of some of these pre-Inca cultures would most likely have found large stretches of the aboriginal Andes in the state described so carefully by the Incas, and the latter undoubtedly borrowed from them this original history, like part of their own culture.

The Inca imitators as solar deities

Inca Garcilasso, after describing Titicaca Island in the highland lake of the same name, says:

"The Yncas say that it was on this island that the Sun placed his two children, male and female, when he sent them down to instruct the barbarous people who then dwelt on the earth. To this fable they add another of more ancient origin. They say that, after the deluge, the rays of the Sun were seen on this island, and on the great lake, before they appeared in any other part. ... The first Ynca, Manco Ccapac, taking advantage of the ancient fable, and assisted by his own genius and sagacity, seeing that the Indians venerated the lake and the island as sacred things, composed a second fable; saying, that he and his wife were children of the Sun; and their father had placed them on that island, that they might thence pass through the country, teaching the people in the manner that has been fully related at the beginning of this history. The Yncas Amautas, who were the philosophers and learned men of the State, reduced the first fable to the second, teaching it as a prophecy, if one may use such a term. They said that the Sun having shed his first rays on that island, whence to illuminate the world, was a sign and promise that on the same spot he would place his own children; whence to go forth instructing the natives, and drawing them away from the savage condition in which they lived, as those kings actually did in after times. With these and similar fables, the Yncas made the Indians believe that they were children of the Sun; and they confirmed this belief by the numerous benefits they conferred upon the people."

Garcilasso received the above account from his Inca relatives, who strove to make their subjects believe that their own family ancestor, the first Inca Manco Ccapac, was the direct son and first disciple of the sun. But Garcilasso also has to put in a reference to Tiahuanaco. He admits that "the most current opinions touching the origin of the Inca kings" which were held by "most of the people of Peru, that is, the Indians from south of Cozco, what they call Collasuyu, and those in the west, called Cuntisuyu," present a slightly different version of the same event:

"In order to make it more authoritative through time (antiquity), they say it happened after the deluge, of which they know nothing beyond that it really took place ... Thus they say that after the waters of the deluge had subsided, a certain man appeared in the country of Tiahuanacu, which is to the south of Cozco. This man was so powerful that he divided the world into four parts, and gave them to four men whom he honoured each with the title of king, the first of whom was called Manco Capac, the second Colla, the third Tocay, and the fourth Pinahua. To this they add that he gave the northern part to Manco Capac, that of the south to Colla (after whom that great province has ever since been called), to Tocay that in the east, and to Pinahua that of the west. They further assert that, after having thus favoured them, he sent each one to the land pertaining to him, to conquer and govern all the people there found."[1]

It is clear that the Incas did not favour this more widespread account, which deprived them of the claim that they themselves were direct descendants of the sun, and which made the emperor of Tiahuanaco the first and supreme human Lord of Peru, rather than their own progenitor Manco Capac.

The Inca, with all their power, had not quite managed to suppress the memory among the masses that an older and more powerful empire had existed in the Andes, with its seat at Tiahuanaco, prior to Manco Capac's march to establish the subsequent Inca capital in the old site at Cuzco.

Early chroniclers like Cieza de Leon, Juan de Betanzos, Sarmiento de Gamboa, Pachacuti-Yamqui Salcamayhua, Francisco de Avila, Joseph de Acosta, Anello Oliva, Pascual de Andagoya, Fernando Montesinos, and Garcilasso de la Vega have shown that there were memories in aboriginal Peru of important cultural, religious, and political events of pre-Inca times all centring about Lake Titicaca, and more specifically Titicaca Island and the megalithic site of Tiahuanaco. Both places are near the southern end of the same lake, and both have ecclesiastical ruins of superior workmanship of admittedly pre-Inca origin. Here Viracocha is remembered as having made his first appearance among the Indians, and here he built his first abode, from which he spread his culture and benefits all over Peru. Here too, the white and bearded men, the viracocha-runa or Sea-foam people were active during Viracocha's reign, until they were sent by their chief, on their final mission northwards, or killed in the local fighting. From this same area, with the same inland island, and, probably *in part* from the same blood, came the Inca, hardly as direct successors of the original Tiahuanacans, but more probably only after a considerable period of intermediate Andean kings or provincial chiefs.

Titicaca Island was the "birthplace" of the sun and of Viracocha, and it was the subsequent "birthplace" of the Inca. According to tradition, Viracocha proceeded to Tiahuanaco, which became his principal seat under his various personal names, until he left by way of Cuzco, Cajamarca, and the Pacific coast at Puerto Viejo. The subsequent solar representatives, the Incas, proceeded straight northwards to Cuzco, which became their principal seat from the legendary period of Manco Capac down to the time of Atahualpa and the arrival of the Spaniards.[2]

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[1] Translation by Bandelier (1910, p. 309).

[2] The importance of the Titicaca basin in the legends and traditions of the Inca has been pointed out by many. La Barre (1948, p. 21) wrote: "The earliest history of the Lake Titicaca region is shrouded in legends. A most persistent tradition is that the first Inca, Manco Capac, and his sister-wife Mama Ocllo, came from the Island of Titicaca. ... Another legend is that a white, bearded race advanced from the shores of Lake Titicaca, established their ascendency over the natives, and taught them all the elements of culture."

Zapalla Viracocha and Zapalla Inga, the "Only Chief", Gómara's version

Francisco Lopez de Gómara (1553) who never went to Peru himself, but who had direct information from the earliest Spaniards to visit the newly discovered Inca Empire, says of the Inca that: "Their origin was from Tiquicaca, which is a lagune in the Collao, forty leagues from Cuzco, the name of which signifies Island of Lead... The principal Inca who took away from Tiquicaca the first ones and led them, was called Zapalla, signifying only chief. Some aged Indians also say that he was called Viracocha, which is to say 'grease of the sea,' and that he brought his people by sea. They finally affirm that Zapalla peopled and settled Cuzco, whence the Incas began to make war upon the surroundings."[1]

Zárate's version

After Gómara, Augustin de Zárate (1555), who came to Peru as early as 1543 and had access to first hand information, presented a remarkably similar version: "... and there was no general lord of the whole land, until from the region of the Callao, from a great lagoon there is [in it], called Titicaca, which has eighty leagues in circumference, there came a very warlike people which they called ingas. These wore the hair short and had the ears perforated, with pieces of gold in the holes which enlarged the apertures. These called themselves [are called] ringrim, signifying ear. And the principal among them they called Zapalla inga, [the] only chief, although some mean to say that he was called inga Viracocha, which is 'froth or grease of the sea,' since, not knowing where the land lay whence he came, [they] believed him to have been formed out of that lagune."[2]

Anonymous chronicler

Bandelier (1910, p. 305) also cites a very early incomplete and anonymous document (*Conquista y Poblacion del Perú*), which is also mentioned by Prescott and apparently dates back to the early period of Spanish colonization in Peru. The text runs: "After this was done, these large-eared people [Orejones] say that the manner in which they got a chief among themselves was, that [from] a lagune which is thirty leagues from Cuzco, in the land of Collao, and [which] is called Titicaca, the principal of them, who called himself [was called] Viracocha, came forth, who was very shrewd and wise and said he was a child of the sun. And of this one they say that he gave them polity in dress and in building houses of stone, and he it was that built the Cuzco and made stone-houses and the fortress and house of the sun..."

Gutierrez' version

A somewhat similar account is presented by Pedro Gutierrez de Santa Clara (1603), who arrived in Peru before Cieza and remained even longer. He says (Pt. III, p. 421) that the oldest Indians told him that they had heard from their forefathers and their songs that six hundred years before the Spaniards came the first Incas took over Peru in a period when only *curacas* or local chiefs reigned over the land, each in his own province. Gutierrez says further:

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[1] Translation by Bandelier (1910, p. 304).

[2] Translation by Bandelier (1910, p. 305).

"The first Indian lord who began to enter foreign lands was called Mango Ynga Zapalla and this Indian initiated the wars. He went forth with armed people from a large island called Titicaca, which is in the midst of a lagune that is very large and quite deep, in the great province of *Atun Collao*. This Mango Ynga Zapalla succeeded in becoming a very renowned and preferred lord, more than all the small chiefs, curacas, that were around that lagune; on account of which he, by advice of the fiend and of the sorcerers, sought to occupy their lands in a thousand ways, modes and manners he could, and to place them under his lordship and command. And with this intention he went forth with many people from the Island, in many rafts made of canes and dry wood."[1]

Gutierrez states however, that this Mango Ynga Zapalla did not go to Cuzco, but settled near the lake, where he established "his seat and royal court" in the great Collao.

Personal name general title

It is, of course, a question whether Zapalla really was the name of an early Inca or only another name for Viracocha. The personal name of any native culture-hero should be treated with the utmost care, especially when we are dealing with people like the early Peruvians—and the Polynesians—among whom a name could be very loosely attached to one individual. One person might be named and renamed many times according to his appearance, activities, or mode of life, and what appears to us to be a personal name may very often be an honorary title and sacred allusion or a mere descriptive phrase. The present author has on three different occasions been renamed among the Polynesians; on the last of these he was as a specific honour given the full name of the principal former king on Raroia.

Since the Incas copied the Viracochas in sallying from Titicaca Island to the mainland as children of the sun, it would be natural for them to adopt their name, if only to assist the Inca dynasty in its attempt to be the "only chiefs". In fact, as just cited from Zárate, Zapalla means the "only", and is in all likelihood an honorary epithet used as much by Manco Capac as by Viracocha. Brinton (1882, p. 174) says: "Yet another epithet of Viracocha was Zapala. It conveys strongly and positively the monotheistic idea. It means 'The One,' or, more strongly, 'The Only One'. "

It is clear that either Mango Ynga Zapalla must be identical with—or there must be every reason for confusing him with—the first Inca Manco Capac. The former means "Mango, Only Ynga" or "Manco Only Inca," and the latter means "Manco, Great or Powerful." (Tschudi 1853, p. 148.)

The confusion caused by Viracocha's epithet Zapalla, when applied also to the first Inca "Manco", is apparent: Gómara states that the principal Inca was remembered simply as Zapalla, signifying Only Chief, and that he came with his men from Titicaca and settled Cuzco, whereas some aged Indians said he was called Viracocha and that he brought his people by sea. And Zárate similarly stated that the first ingas, known as *ringrim* or long-ears, came from Titicaca to Cuzco under the leadership of Zapalla, the only chief, although some informants told him that this was the inga Viracocha. Finally, Gutierrez says that Zapalla never went to Cuzco, but settled in the great Collao near the lake and the islands, whence he brought his army on rafts.

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[1] Translation by Bandelier (1910, p. 302).

Also Bandelier (1910, p. 333) points out that Zapalla is not a name but a *title*, and that the native word for "alone" or "the only one" is, in the Quechua and Aymará tongues respectively *Çapalla* and *Sapaktha*. He even points to the analogy in name, place of residence, and life story, between Zapalla and Zapana, the latter being a celebrated war-chief who reigned in the Collao long before the time of the first Inca; according to Cieza he lived in the time of one Cari and of the final massacre of the white and bearded people on Titicaca Island. (Cieza, Part I, Chap. C; Part II, Chap. IV.)

Further chroniclers: Pizarro

We possess yet further accounts showing the importance of Titicaca in the traditional history of the Incas. Pedro Pizarro (1571, p. 233), an eye-witness from the day of conquest, merely states: "These Indians say that an Inga was their first lord. Some say he came from the Island of Titicaca."

Molina's account of Tiahuanaco immigrants

Father Cristóval de Molina (1570—1584, p. 4) took again more interest in the local legends, which he had ample opportunity of collecting as priest in the Indian hospital at Cuzco. He was told of a flood in which most of humanity perished, but a few survivors arrived miraculously in Tia Huanaco. Further, that: "The Creator of all things commanded them to remain there as *Mitimas* [colonists or settlers]; and there, in Tiahuanaco, the Creator began to raise up the people and nations that are in that region, making one of each nation of clay, and painting the dresses that each one was to wear."

Molina (*Ibid.*, p. 5) also makes a reference to the ancient stone statues: "There are other nations which say that when the deluge came, all people were destroyed except a few who escaped on hills, in caves, or trees, and that these were very few, but that they began to multiply, and that, in memory of the first of their race who escaped in such places, they made idols of stone, giving the name of him who had thus escaped to each *huaca*." Further: "They say that the Creator was in Tiahuanaco, and that there was his chief abode, hence the superb edifices, worthy of admiration, in that place."

Inca ordained by human sun from Tiahuanaco

According to Molina, the Inca played no part in these early doings. They alleged that in this early period all was dark, until the Creator made the sun and the heavenly bodies at Tiahuanaco, and told them to go to Titicaca Island and thence rise to heaven. And, as soon as the sun, in the form of a man, was ascending to heaven, he called to Manco Capac as the oldest Inca, and told him to proceed from the island to subdue foreign tribes and to make himself the great lord of the many nations. He should look upon the sun as his father, and worship the sun.

Inca imitation in emergence from cave. Cobo's versions

The Jesuit and historian Bernabé Cobo, who came to Peru in 1599, found that the Indians of Peru disagreed considerably in their accounts of the supernatural origin of the Incas, although they agreed in making Titicaca Island their place of origin. Some maintained (Cobo 1653, Vol. III) that the Incas, clad in a very different dress from that worn by the local people, and with their ears perforated with weights of gold, simply proceeded under the leadership of Manco Capac from Lake Titicaca to Cuzco by way of a cave at Pacarictampu (or Pacari-tambo), a few leagues from Cuzco and in the same valley. Others believed that the Creator had led the Inca party from Titicaca through the caverns of the earth until they came forth through the sacred cave of Pacarictampu. Others, again, held that the Creator Ticciviracocha or Pachayachachic had created the sun as a resplendent man at Tiahuanaco (Tiaguanaco), and that he sent him to Titicaca Island, where he instructed Manco Capac before he rose into heaven, and that Manco Capac and his Inca brothers then sank into the earth and came out again at the cave of Pacarictampu. Yet others related that the Sun, seeing the miserable conditions on earth, sent his son and daughter to Lake Titicaca, whence they were told to set out as they pleased, instructing the people and teaching them the knowledge of the Sun, and persuading them to recognize his authority and yield him the adoration that was his due.

Cobo, like Garcilasso, relates at length the wellknown myth of how the sun presented to Manco Capac a golden rod or staff, with which he should strike the soil wherever he took rest. Where the rod sank into the ground, he should take up his abode. One cannot but feel that this procedure was just an ingenious way of enshrouding in a veil of sorcery and magic the very simple procedure of any agriculturist like the Inca, when searching soft and deep humus for a favourable new abode in the Andes.

Cobo finally says: "Another fable of the origin of the Incas is much similar to this, except that it affirms that the first ones were born on the above-mentioned island by a woman called Titicaca, for which reason they have chosen the name which the island in the lake has today."

Ramos' account of homicide of white Tonapa at Titicaca

Bandelier (1910, p. 327), in collecting aboriginal myths and traditions concerning Titicaca Island, mentions the rare publication of Fray Alonzo Ramos Gavilan (*History of Capacabana*, Lima, 1621). This also mentions a belief that Titicaca Island was Manco Capac's place of origin. Bandelier adds:

"Ramos also speaks of a mysterious white man called Tunupa and Taápac, murdered by the Indians on the Island. Mention is also made of the belief that, after several days of obscurity, the sun came out of the Sacred Rock. ... the Tonapa tale as related by Ramos is almost identical with the statements on the same topics by Salcamayhua, another contemporary of his. It will be recollected that Tunapa was already alluded to by Cieza, but very few are the details he gives, in comparison with what is contained in the writings of Ramos and Salcamayhua. Between 1550 and the beginning of the seventeenth century only a few fragments of stories resembling the Tonapa or Tunapa tradition are as yet known.

Hence it is possibly a Colla or Aymará tale, heard by Ramos and Salcamayhua from Aymará Indians or (in case of the latter) from Quichuas confining with the Aymará stock."

Oliva's account of Manco Capac's arrival along the coast from the north

Another early chronicler, the Jesuit Anello Oliva (1631), came to Peru about 1597 and took up his headquarters down on the coast, in Lima. He also spent some time in the highlands on the shores of Lake Titicaca. In his *History of Peru* his aim seems to be not to translate and present the native traditions verbally, but to interpret their contents in accordance with his own suppositions and geographical outlook. The contents of his narrative must be judged accordingly.

Oliva's informants have left him with the impression that, after a deluge, some people moved down from the far north of South America (Oliva suggests Venezuela). Having gradually got as far south as the vicinity of Santa Elena (in the northern part of the former Inca Empire and in the southern part of the present Ecuador), the migrants settled for several generations. "Many made voyages along the coast and some were shipwrecked. At last one branch took up its abode on an island called Guayau, near the shores of Ecuador." On Guayau Island a certain Atau had died after first becoming the father of Manco Capac.

With this strange prelude to Manco Capac's life-story, Father Oliva proceeds to bring the culture-hero from the seashore and up to his reputed birthplace in the cave of Pacari Tampu: "On that island Manco Capac was born, and after the death of his father Atau he resolved to leave his native place for a more favoured clime. So he set out, in such craft as he had, with two hundred of his people, dividing them into three bands. Two of these were never heard of again, but he and his followers landed near Ica, on the Peruvian coast, and thence struggled up the mountains, reaching at last the shore of Lake Titicaca. There Manco separated from the others, leaving them with orders to divide after a certain time and to go in search of him, while he took the direction of Cuzco. He told his people, before leaving, when any of the natives should ask them their purpose and destination, to reply that they were in quest of the son of the Sun. After this he departed, reaching at last a cave near the Cuzco valley, where he rested."

When the time had elapsed, Manco Capac's companions started in search of him in several groups. Some crossed over to Titicaca Island, where they sunk the craft in which they had crossed the lake, and hid in a cavern on the island. A few days later, when they saw some local people approaching by water, they came out of the cave in the rock and said they were in quest of the son of the Sun. "This filled the others with profound respect for the newcomers; they worshipped them and made offerings to the rock, sacrificing children, llamas, and ducks. All together went back to the mainland, and shortly afterward learned that at Pacari Tampu the son of the Sun had come out of a cavern, called Capactocco, in great splendour, bedecked with gold, as brilliant in appearance as his father, and that with a sling he had hurled a stone with such force that the noise was heard for more than a league off, and the stone made in the rock a hole as large as a doorway. At this news all the people of those regions went to see the miraculous being. Manco Capac received them as subjects. On this artifice he began to base his authority and the subsequent sway of the Inca tribe."[1]

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[1] Translation by Bandelier (1910, p. 325).

In another passage Father Oliva adds that, long before this, an all powerful lord had had his seat in Tiahuanaco, the oldest settlement in the land.

All the above-mentioned accounts of the Inca origins begin with the sudden appearance of Manco Capac as he marches forth with his followers in all his final glory from the cave of Pacari Tampu, or from the lakeside on the Titicaca plateau. Father Oliva's version differs essentially in its prelude, which brings the people up from the coast on a well-organized plan, so that they may approach the local people under cover, suddenly appearing in their midst as the children of the Sun. Such an ingenious scheme may very likely have been conceived by the Inca when first intruding upon the Cuzco Indians and establishing their dynasty as solar kings. Yet, Oliva's account of the coastal voyage and ascent from Ica, being unique among the early chronicles, cannot have the weight it might have had if corroborated by other early writers. But as he is unlikely to have invented the tradition himself, we must at least count with the possibility of his having heard some legend current in the lowlands of the arrival of some early culture-people from the coastal area to the north. We shall later return to the question of cultural diffusion between the various great centres of the pre-Inca high-cultures on the coast and in the highlands, when we turn from the field of native history to the more concrete testimony of archaeology.

Fair individuals behind the fraud of sun-descent

We cannot leave Oliva's account without adding Stevenson's version, which also brings Manco Capac secretly up from the coast before he revealed himself to the mountain Indians. Stevenson, like Oliva long before his time, collected his Manco Capac tradition near Lima on the coast about 150 years ago. Since Bandelier (1910) and other late writers have verified myths collected by Cieza at the time of the Conquest, we may find it not impossible that Stevenson's informants also have inherited some fragments of traditions and beliefs current on the Peruvian coast at the time of Oliva. Stevenson's account has been little regarded through the curious circumstance that he, or rather his informants, described the first Inca as an *Englishman* (Ingasman). This is a linguistic mistake which has a very simple and natural explanation: As will be seen, the syllables in the names of Inga Manco Capac and his sister-wife Mama Ocllo are distorted into Ingasman Cocapac and Mama Oclle.

Stevenson (1825, Vol. I, p. 394) heard this oral tradition at the old Peruvian village of Huacho on the Pacific coast north of Lima. "It was", he writes, "afterwards repeated to me by Indians in various parts of the country, and they assured me that it was true, and that they believed it. A white man [in Quechua text a *viracocha*], they say, wasfound on the coast, by a certain Cacique, or head of a tribe, whose name was Cocapac; by signs he asked the white man who he was, and received for answer, an Englishman [I. e: *Ingasman*]. He took him to his home, where he had a daughter; the stranger lived with him till the daughter of the Cacique bore him a son and a daughter, and then died. The old man called the boy Ingasman Cocapac, and the girl Mama Oclle; they were of fair complexion and had light hair, and were dressed in a different manner from the Indians. From accounts given by this stranger of the manner in which other people lived, and how they were governed, Cocapac determined on exalting his family; and having instructed the boy and girl in what he proposed to do, he took them first to the plain of Cuzco, where one of the largest tribes of Indians then resided, and informed them that their God, the sun, had sent them two of his children to make them happy, and to govern them; he requested them to go to a certain mountain on the following morning at sunrise, and search for them; he moreover told them that the *viracochas*, children of the sun, had hair like the rays of the sun, and that their faces were of the colour of the sun. In the morning the Indians went to the mountain, *condor urco*, and found the young man and woman, but surprised at their colour and features, they declared that the couple were a wizard and a witch. They now sent them to Rimac Malca, the plain on which Lima stands, but the old man followed them, and next took them to the neighbourhood of the lake of Titicaca, where another powerful tribe resided; Cocapac told these Indians the same tale, but requested them to search for the viracochas on the edge of the lake at sunrise; they did so, and found them there, and immediately declared them to be the children of their God, and their supreme governors. Elated with his success, Cocapac was determined to be revenged on the Indians of Cusco; for this purpose he privately instructed his grandchildren in what he intended to do, and then informed the tribe that the viracocha, Ingasman Cocapac, had determined to search for the place where he was to reside; he requested they would take their arms and follow him, saying that wherever he struck his golden rod or sceptre into the ground, that was the spot where he chose to remain. The young man and women directed their course to the plain of Cusco, where having arrived, the signal was given and the Indians here, surprised by the re-appearance of the viracochas, and overawed by the number of Indians that accompanied them, acknowledged them as their lord, and the children of their God. Thus, say the Indians, was the power of the Incas established, and many of them have said, that as I was an Englishman I was of their family."

How much original tradition has survived in this Huacho account cannot be judged. In its essence, it supports the statement of Oliva's informants from the same vicinity that Manco Capac entered the highlands from the coast on a deliberate plan that he should be sought for and discovered among the inland tribes as the son of the sun. The shores of Lake Titicaca also come into this legend. And, although the version is different, the Inca progenitors are, as in the Titicaca myth, accounted for by a crossing of two distinct human types. A semi-civilized viracocha from another area, with other dress, and of light complexion, marries locally on the coast, and his light progeny take advantage of their fairer complexion to obtain an ascendancy over the inland tribes by pretending to be of supernatural origin and children of the sun.

The essence of Peruvian traditional memories

We have dwelt at some length on the earliest Inca memories and traditions. This has not been done for the sake of the various details, but only to show how all recollections converge back to a time when Andean culture was focused upon Tiahuanaco and the Titicaca basin—when there were legendary people travelling about in Peru who were not zoomorphic or demoniacal, but Caucasian-like.

All over Peru references are found to such an earlier people whose grandiose creative powers and capacities, coupled with ingenuities and deceptions, with cultural achievements and humanitarian activities, opened the road for the Incas, who copied their forerunners wherever and whenever they found opportunity. We are informed about the physical appearance of the early Viracocharuna, or Sea-foam-people, principally through the detailed descriptions of their leader, whether he be Viracocha, Tici, Con, Illa, Ticci Viracocha Pachayachachi, Ymaymana Viracocha, Tocapo Viracocha, Coniraya Viracocha, Viracocha-Ra-Pacha, Pacha-ccan, Zapalla Viracocha, Tara-Paca, Tua-Paca, Tu-Paca, Caylla, Usapu, Arunaua, or Tonapa. Through this leader, his sons, disciples, servants and followers, we are given a description of the Tiahuanaco-people that distinguishes them from the bulk of the population by a more highly developed culture, a very light skin-colour, the growth of a beard, and occasionally a tall stature. There are also instances where minor groups are described directly instead of through their own principal 'god' and ruler, as was the case with the isolated and purely human intruders at Vinaque, and those massacred at Titicaca Island. Although they here appear as loose tribal units without any powerful king or hierarchy, yet they were memorized by the other Indians as being unlike all their neighbours, solely in the physical peculiarity of being white and bearded, like the Spaniards.

These two racial characteristics—a light complexion and a beard—are certainly the most readily perceived of all the Caucasian-like features reaching early Polynesia in the East Pacific. Of all such traits they would be those that would most naturally make a lasting impression upon the average Indian of Peru, so that the description of them would survive in tribal and national memory.

The Viracochas and the appearance of the Spaniards

We have seen that the last South American memory of the Tiahuanaco dynasty was that the venerated pre-Inca ruler organized a united departure of his *viracocha*-people from the tropic coast of Ecuador, thus abandoning his own former cult-site and all his Peruvian people. There is no disagreement as to the route he decided upon. As Rowe (1946, p. 316) summarizes the Inca accounts: "He went to Cuzco, and continued northward to the province of Manta in Ecuador. Here he said farewell to his people, and set out across the Pacific walking on the water."

The Peruvian belief in the extinct and departed viracocha race was firm and deeply rooted. The Inca dynasty had so profound a respect for their fair-skinned and bearded forerunners who had departed into the Pacific that, in 1532 Pizarro and his little band of Spanish voyagers were able to conquer, without battle, the vast Inca Empire with its powerful armies and its elaborate megalithic fortresses. For the Spaniards the battle was won merely by appearing with a skin colour and beard such as had been the distinctive features of the departed Viracochas.

The historical implications of the legendary white and bearded men behind the early Inca history have been pointed out by many writers. Karsten (1938, p. 72) refers to the Inca assumption that the first Spaniards to land on the coast were messengers sent back across the Pacific by the long departed Viracocha. He further points to the fact that viracocha "even to this day is the term for a foreign white man among the Indians, in all the countries—Peru, Bolivia and Ecuador—which belonged to the old Inca Empire."

The same author, showing how Viracocha under his various titles or names[1] finally left the highlands while descending to the Pacific coast, says (*Ibid.*, p. 192): "That Viracocha upon the act of creation wanders down towards the coast is perhaps connected with the historical fact that at a certain period the worshippers of the god conquered these regions. That he furthermore is represented as a bearded man who disappears in the great ocean is another feature that possesses historical interest. When the Spaniards during their march of conquest in 1532 arrived on the coast of Peru, they were, as I have already mentioned, taken by the adherents of Huascar for no less than the messengers of the supreme god Viracocha, which came to revenge the injustice committed against the legitimate heir to the throne. Therefore viracocha became to the Indians of Peru a general term for the white man."

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[1] Karsten (*Ibid.*, pp. 188—192) renders the different names connected with this culture-hero as: Con, Tici, Ticci, Ticsi, Tici Viracocha, Illac Tici Viracocha, Con-Illac-Tici-Viracocha and Con-Tici-Viracocha.

Similarly Brinton (1882, p. 199), in his study of American hero-myths, writes of the Spaniards' arrival: "As at the first meeting between the races the name of the hero-god was applied to the conquering strangers, so to this day the custom has continued. A recent traveller tells us, 'Among Los Indios del Campo, or Indians of the fields, the llama herdsmen of the *punas*, and the fishermen of the lakes, the common salutation to strangers of a fair skin and blue eyes is 'Tai-tai Viracocha'. (Squier, Travels in Peru.) Even if this is used now, as M. Wiener seems to think, merely as a servile flattery, there is no doubt but that at the beginning it was applied because the white strangers were identified with the white and bearded hero and his followers of their culture myth, whose return had been foretold by their priests."

There was much speculation among the Spanish conquistadores as to why the term *viracocha* was everywhere applied to their race as they advanced through the vast Inca Empire, and finding the meaning of the word to be "sea foam," many concluded that they had been so called because they had come by sea. Cieza de Leon (1553-60, Bk. II, Chap. V) firmly rejects this opinion, stating that he had sought an explanation among the "long-ears" of Cuzco and had been told that the Spaniards were thus named because they had first been mistaken for the sons of the great god Tici-Viracocha, to whom Huascar's men had prayed for help against their enemy Atahualpa. But when the Spaniards began to violate the *mamaconas* or virgins of the sun, and plunder the sacred temples of Viracocha, the natives soon realized that they were mistaken, and that these men were not the sons of the great Viracocha, but worse than Supais (*Cupay*, i. e. devil). But the name *viracocha* remained as descriptive of the Spaniards and their white and bearded race.

Sarmiento (1572, p. 186), quoted in detail in another place, similarly shows how the Spaniards, arriving with *beards*, were taken for returning viracochas.

Inca Garcilasso also (1609 b, p. 65) stresses that the Spaniards were termed viracochas not because they came by sea, but because of their appearance: "Hence it was that they called the first Spaniards who entered Peru Uira-ccocha, because they wore beards, and were clothed from head to foot, ... For these reasons the Indians gave the name of Uira-ccocha to the Spaniards, saying that they were sons of their god, Uira-ccocha..."

Garcilasso says that their appearance ensured the strange reception of a handful of bearded Spaniards among the vastly superior forces of Peru. He mentions as an example how Hernando de Soto and Pédre de Barco, all alone, set out on long inland journeys among the numerous alien Indians without ever being assaulted; on the contrary they were at once received with enthusiasm among the various tribes who everywhere called them the "sons of the sun".

Nature of Viracocha memories

The viracocharunas and the great man-god Con-Tici Viracocha had all the aspects of humans, but humans with a cultural standing. They grew beards and had a lighter skin than the average Indian, but no more than the Spaniards and the Inca sovereigns do they appear among their contempotaries with any incongruous physical traits that suggest them to be fanciful conceptions. The well-informed and intelligent Inca would never have lent such weight to the accounts of their predecessors from Tiahuanaco if these had been merely the creatures of a native fairy-tale. We must not regard the viracochas as on a level with dragons and unicorns; if they were breathing fire instead of growing beards, and if they could fly, were luminiferous, or green or blue, instead of walking about with a staff and a long girdled mantle, and a fair skin, then the viracocha tales could have been dismissed as born of the human fancy for the supernatural. But as it is, we have every reason to suppose that in their case the human fancy for the supernatural has been stimulated by the observation of some actual human beings differing slightly from the local norm of physique and physiognomy. If the Spaniards had left Peru before they could overthrow the Inca Empire, twentieth century rediscoverers of Pacific South America would have heard quite similar legends of Viracocha Pizarro who came and left by sea with his viracocha followers, except that the Spaniards with their horses, iron swords and muskets would have been raised to a much more supernatural level than the former viracochas of Vinaque and Titicaca.

It seems to me rather rash to assume that natives all over Incaic Peru, Bolivia, and Ecuador should have first improvised and later digested and accepted the physical appearance and geographical routes of the viracochas, had they not once been visited by some people with a somewhat corresponding description and migratory route. Indeed it is less fantastic to suppose that a light-skinned tribe with beards had developed in—or migrated to—this area, seeing that we know an analogous human type to have developed in—or migrated to—both sides of the North American continent and the nearest islands west of Peru, all in pre-Columbian centuries.

That the conception of men with Caucasian-like characteristics might have been due to the sight of the first Spaniards is out of the question, since the traditions are supported by bearded prehistoric portraits carved in Tiahuanaco, Mocachi, and Cacha stone statues, and modelled in Chimbote-, Huamachuco-, Moche-, and Chicama anthropomorphic pottery, all properly ascribed to pre-Spanish—and most of them even to pre-Inca—time.

Hypothesis of white and bearded wanderers being personified light-rays

The Polynesians possessed traditions, both metaphorical and direct, of early Caucasian-like ancestors who had come to settle the Polynesian islands and had thus entered into the forming of the present island stock. The value of these traditions is readily verified through the recent recognition of a Caucasoid element in the original population of these islands. The Peruvians possess complementary traditions and memories regarding their own continental domain, with the only major difference that whereas the Polynesians claim them to have arrived, the Peruvians claim them to have departed.

The possibility that Caucasian-like immigrants could have reached Polynesia by way of the East Pacific has never struck observers, and hence the firm Inca conceptions of pre-Spanish *viracochas* have attracted no attention. They have not been required in any attempt to reconstruct the local Peruvian past, and whenever a bearded pottery vase, a bearded statue, or myths of a white and bearded race have turned up locally, this has meant to the local Peruvianist only a new enigma rather than an answer to an existing problem.

Accordingly, the only hypothesis advanced from competent quarters to account for the Caucasoid conceptions in prehistoric Peru has been designed and launched solely for the purpose of neutralizing their surprising existence. Such a theory, defended by Brinton (1882) and great many others, suggests that all white men with beards (provided they occur in pre-Spanish America) are immaterial personifications of light-rays from the sun. The light skin is the bright light, and the bearded chin is its radiation. Brinton and the defenders of this theory simply exclude from consideration the alternative possibility, that beard and light skin were physical traits known even in America before Columbus. Both alternatives should at least be tested before being either rejected or accepted.

Brinton (*Ibid.*, p. 188), together with Pachacuti, observes how the departed culture-hero Tonapa—described in the previous pages respectively as a bearded man and a white man identical with the creator Viracocha—followed the westward course of a river in descending to the seashore, whence he left Peru. Then he says, referring in part to Garcia (1729, Bk. V, Chap. VII):

"According to another, and also very early account, Viracocha was preceded by a host of attendants, who were his messengers and soldiers. When he reached the sea, he and these his followers marched out upon the waves as if it had been dry land, and disappeared in the West. These followers were, like himself, white and bearded. Just as, in Mexico, the natives attributed the erection of buildings, the history of which had been lost, to the white Toltecs, the subjects of Quetzalcoatl, so in Peru various ancient ruins, whose builders had been lost to memory, were pointed out to the Spaniards as the work of a white and bearded race who held the country in possession long before the Incas had founded their dynasty. The explanation in both cases is the same. In both the early works of art of unknown origin were supposed to be the productions of the personified light rays, which are the source of skill, because they supply the means indispensable to the acquisition of knowledge."

To me, this explanation is more ingenious than natural. Why did the light rays carve stone monuments with beards and tell the people to lengthen their ears, and why did they march due north from Tiahuanaco to Cajamarca and hence climb down along the river from the mountains to the sea, where they all assembled near Puerto Viejo to start walking on the waves? Why were they presented in art with a pointed beard (see Plates XXIV, XXV) rather than with a radiant aureola, and why remembered as having a fair skin rather than a luminiferous one? Indeed the tribal name viracocha-runa or sea-foam people suggests a maritime rather than a celestial body of migrants, and they also travelled by sea and not in the sky.

The only tempting aspect of the theory identifying white and bearded men with personified light rays is that, like the sun, they disappeared over the ocean to the west, and that too at Puerto Viejo, *suspiciously near the sun's favourite latitude, the Equator*, but—at a rather human and maritime altitude when compared with their heavenly guide the sun. But even this strong-point is weakened when Brinton (*Ibid.*, p. 188) finds it necessary to argue that the ocean-bound Viracocha must actually have turned north and east off the coast, rather than west, as the Peruvian "personified light rays" would otherwise travel in an opposite direction to those of Mexico!

In fact, if we compare the many American myths of the light-skinned and bearded wanderers, we find their movements entirely independent of the route of the sun; they come and go in various directions, and only Puerto Viejo, at the very Equator, and Cape Scott, on the Northwest Coast, are remembered as places where American culture-heroes or parties of travellers have departed westwards into the Pacific. In the many other traditions of the wanderers, these strange and typical New World man-gods move from one given settlement to the other, following remarkably human itineraries, by land or along the coasts, and going as often north or south as east or west, or even back and forth. To the culture-peoples of Mexico and Peru these legendary heroes were apparently no more supernatural in appearance and behaviour than the Spaniards, since the latter were mistaken for the former.

The current misconception that the white and bearded wanderers of the Aztecs and the Incas come and go after a common pattern set by the sun has had a surprising amount of support in view of its loosely founded premises. Brinton (*Ibid.*, p. 200), referring to the historical accounts of how the Incas mistook the Spaniards for viracochas returning from the west across the Pacific, says: "We need no longer entertain about such statements that suspicion or incredulity which so many historians have thought it necessary to indulge in. They are too generally paralleled in other American hero-myths to have the slightest doubt as to their reality, or as to their significance. They are again the expression of the expected return of the Light-God, after his departure and disappearance in the western horizon."

If the viracochas were imaginary light-gods, and as such had disappeared at the *western* horizon and were expected back from across the Pacific rather than over the eastern Cordilleras, then the light-ray theory would require the imaginary light-gods of aboriginal Mexico also to travel in the same direction. Such, however, was not the case. When dealing with the Mexican wanderers, Brinton found that these were said to have departed in the opposite direction, towards Yucatan, and that hence the Aztecs expected their "bearded ones" back from the Atlantic side. About these Aztec beliefs also he wrote (*Ibid.*, p. 141): "They have excited the suspicion of historians and puzzled antiquaries to explain. But their interpretation is simple enough. The primitive myth of the sun which had sunk but should rise again, had in the lapse of time lost its peculiarly religious sense, and had been in part taken to refer to past historical events. The Light-God had become merged in the divine culture hero. He it was who was believed to have gone away, not to die, for he was immortal, but to dwell in the distant east, whence in the fullness of time he would return."

If the departure of the Mexican wanderers in an easterly direction can be used as an argument for the light-ray hypothesis, then their northerly and westward departure from Peru cannot with the same strength serve the same theory, or vice versa. There is also another reason to doubt the consistency of the interpretation under discussion. Brinton

(*Ibid.*, p. 168) suggests that to the American culture-peoples the conceptions of the sunrise in the east and the sunset in the west, with night following day, had become religious, and that gradually "the natural phenomenon had become lost in its personification". On these premises he feels that the departure of the heroes, and the confidence in their future reappearance, could be thus explained (*Ibid.*): "Both of them represented in their original forms the light of day, which disappears at nightfall but returns at dawn with unfailing certainty." Or, as he expresses it elsewhere, (*Ibid.*, p. 30): "The sun shall rise again in undiminished glory, and he lives, though absent." But is the sun absent? So long as the sun *reappears* every morning in undiminished glory, how can the sun be lost in a departed personification for the return of which Mexicans were looking to the east and Peruvians to the west?

Since it is safe to say at least that the migrating bearded spreaders of culture behind the Aztec and Inca traditional history are not obviously "personified light rays", we have little reason to set aside the alternative possibility, that both Aztec and Inca history are actually speaking of bearded humans rather than fading light-rays. The corresponding wanderers who reached Polynesia, according to the island traditions, were obviously humans and not light-rays.

We may follow Brinton further in his analysis of the beliefs and memories under discussion. Amidst the multitude of weird animal stories and beliefs in fantastic supernatural beings that occurred everywhere among the New World Indians, Brinton found one quite distinct and consistent tradition among the more cultured and historically minded peoples, which he terms "the typical American myth". To this he devoted the greater part of his comprehensive monograph on *American Hero-Myths.* We read (*Ibid.*, p. 27):

"The native tribes of this Continent had many myths, and among them there was one which was so prominent, and recurred with such strangely similar features in localities widely asunder, that it has for years attracted my attention, and I have been led to present it as it occurs among several nations far apart, both geographically and in point of culture. This myth is that of the national hero, their mythical civilizer and teacher of the tribe, who, at the same time, was often identified with the supreme deity and the creator of the world. It is the fundamental myth of a very large number of American tribes, and on its recognition and interpretation depends the correct understanding of most of their mythology and religious life. The outlines of this legend are to the effect that in some exceedingly remote time this devinity took an active part in creating the world and in fitting it to be the abode of man, and may himself have formed or called forth the race. At any rate, his interest in its advancement was such that he personally appeared among the ancestors of the nation, and taught them the useful arts, gave them the maize or other food plants, initiated them into the mysteries of their religious rites, framed the laws which governed their social relations, and having thus started them on the road to self development, he left them, not suffering death, but disappearing in some way from their view. Hence it was nigh universally expected that at some time he would return. . . .

"Whenever the personal appearance of this hero-god is described, it is, strangely enough, represented to be that of one of the white race, a man of fair complexion, with long, flowing beard, with abundant hair, and clothed in ample and loose robes. This extraordinary fact naturally suggests the gravest suspicion that these stories were made up after the whites had reached the American shores; and nearly all historians have summarily rejected their authenticity, in this account. But a most careful scrutiny of their source positively refutes this opinion. There is irrefrangible evidence that these myths, and this ideal of the hero-god, were intimately known and widely current in America long before any one of its millions of inhabitants had ever seen a white man."

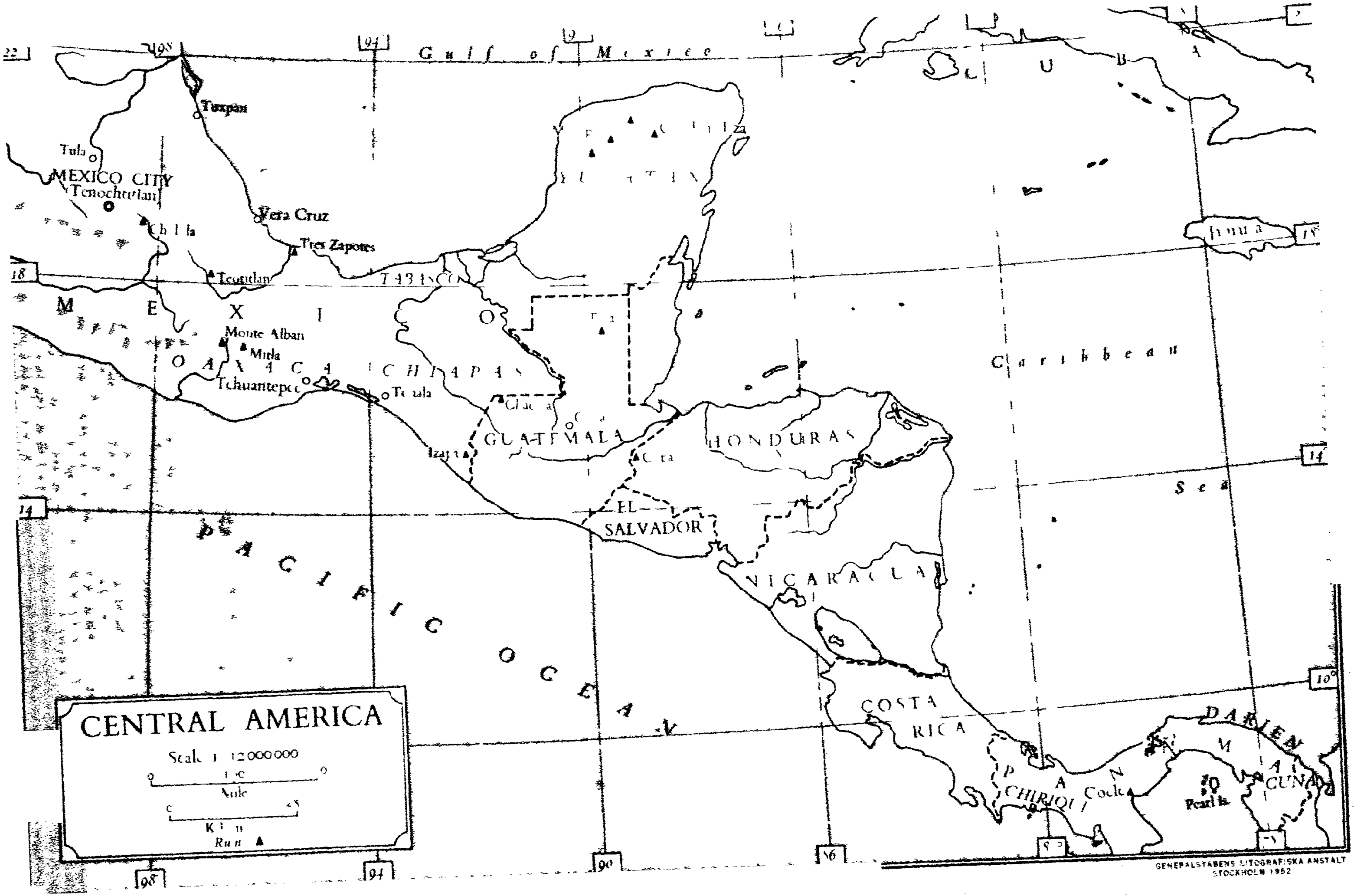
Without discussing, or even mentioning, the possibility that the tribes in question could have seen, or included, lighter-coloured individuals with a true beard before the arrival of the Columbian caravels from Europe, Brinton goes on to explain how these Aztec, Maya, Chibcha, and Inca traditions came about: "By sight and light we see and learn. Nothing, therefore, is more natural than to attribute to the light-god the early progress in the arts of domestic and social life. Thus light came to be personified as the embodiment of culture and knowledge, of wisdom, and of peace and prosperity which are necessary for the growth of learning. The fair complexion of these heroes is nothing but a reference to the white light of the dawn. Their ample hair and beard are the rays of the sun that flow from his radiant visage. Their loose and large robes typify the enfolding of the firmament by the light and the winds."

Yet we need only observe the well groomed and aristocratic beard and moustache in the early Mexican portraits on Plates XVII—XXII, or on the pre-Incaic pottery on Plates XXIII—XXV, to realize that we are dealing with a typical human beard and not with the rays from a radiant visage. Nor do we ever learn that the robes of the white wanderers were loose like the enfolding of the firmament, but simply that their dress was unlike that of the common Indian in reaching down below the knees, and in being secured around the waist by a girdle. There are even instances where we learn that Viracocha, or one of them, wore his hair cut short. Never do we learn that the bearded men were radiant or shed light. They were remembered in connection with a solar religion and claimed solar descent, but in effect they were the masters and institutors of these beliefs, rather than resultant personifications of formerly worshipped light-rays.

Sun-worship originated by wanderers rather than the reverse

Many subsequent authors have followed Brinton's conclusions without giving the same serious attention as he did to the mass of material available. It is commonly considered that the almost continuous recurrence from Mexico to Peru of the analogous beliefs in the light-coloured bearded men diminishes their historic value; for it is argued, all along this route the same solar beliefs have created the same myths of white and bearded wanderers and spreaders of culture. Brinton (*Ibid.*, p. 201) says:

"Are we obliged to explain these [Peruvian] similarities to the Mexican tradition by supposing some ancient intercourse between these peoples...? I think not. The great events of nature, day and night, storm and sunshine, are everywhere the same, and the impressions they produced on the minds of this race were the same, whether the scene was in the forests of the north temperate zone, amid the palms of the tropics, or on the lofty and barren plateaux of the Andes. These impressions found utterance in similar myths, and were represented in art under similar forms. It is, therefore, to the oneness of cause and of


CENTRAL AMERICA
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Jamaica
Caribbean Sea
PACIFIC OCEAN
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OAXACA
CHIAPAS
TABASCO
YUCATAN
Chichen Itza
GUATEMALA
HONDURAS
EL SALVADOR
NICARAGUA
COSTA RICA
PANAMA
CHIRIQUI
Cocle
DARIEN
CUNA
Pearl Is.
Tula
MEXICO CITY
Tenochtitlan
Cholula
Tuxpan
Vera Cruz
Tres Zapotes
Teotitlan
Monte Alban
Mitla
Tehuantepec
Tonala
Izapa
Copan
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18
14
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90
86
GENERALSTABENS LITOGRAFISKA ANSTALT
STOCKHOLM 1952

racial psychology, not to ancient migrations, that we must look to explain the identities of myth and representation that we find between such widely sundered nations."

Again, this statement would have been stronger had the author produced a reason why the conception of the cultural "wanderer" of Mexican, Mayan, Chibchan, and Peruvian traditions could not have spread through the whole of this area by actual inter-tribal migration rather than by the development of an independent philosophy among stagnant and immobile peoples. It is a curious fact that the more modern man develops his own means of cummunication, the less he credits the former mobility of man. People who cross an ocean in a luxury liner have difficulty in perceiving that *at the mere cost of time and comfort* perhaps the same ocean may be readily crossed on a few logs with a contraption to catch the wind; and those who cross a continent by express train forget that others have done it before them without map or track. The human estimation of time and comfort has not always been what it is today, and on this point an immense gap has severed most modern investigators from a full appreciation of the capacity and achievements of former cultures.

The Yellow-brown ancestry of the Quechua and Aymara of Peru, and even their primitive cousins down in the Tierra del Fuego, cannot have been born as light-rays through similar tendencies of the human mind, but must, in the course of time, have come south through Mexico en route from Northwest America and from faraway Asia. A secondary diffusion or transfer of culture or spreaders of culture from Mexico to Peru does not necessarily require much time, not even generations. In 1513 Balboa climbed the hills of the Panama Isthmus and was the first European to sight the Pacific; in 1519 the little Spanish force under Cortes landed in the Gulf of Mexico and began their march into the vast Aztec Empire; by 1533 other small groups of mediæval Spaniards had made several expeditions down South America, and Pizarro with 180 men had then already taken over the Inca Empire; in 1535 Almagro travelled on inland from Andean Bolivia to Argentina and way down into Chile; in 1541 Orellana had climbed the Andean highland from the Pacific side, entered the sources of the Amazone and followed this jungle river to its mouth on the Atlantic.

As Carter (1950, p. 178) puts it: "The Spanish actions in America are probably the best illustrations that we possess of what could have happened in earlier times. There were relatively few Spanish. Yet in the period 1520 to 1540 they explored virtually the entire New World from Kansas to Argentina. Nor can all this be laid to force of arms. Cabeza de Vaca, shipwrecked and barely clad, was able to walk from somewhere on the Gulf Coast of the United States across the continent through all the intervening tribes, to the Gulf of California and thence down to the Spanish holdings in Mexico."[1]

These Spaniards had neither roads nor maps, nor ammunition enough to survive by fighting strength among the American millions. They knew during their "wanderings" less of the dangers and resources of the countries traversed than the culture-heroes who had founded the empires that preceeded those of the Aztecs and Incas.

We have also an interesting example of aboriginal human migration through the most impenetrable territory of the New World, in the earliest decades of written South American history. Sayce (1933, p. 213), referring to a publication by Métraux on the Tupi-Guarani tribes, writes: "About 1540 a Tupinamba tribe left the Atlantic coast and set out toward the west, ten thousand strong. After many vicissitudes and massacres three hundred survivors reached Peru in 1549. Between these rapid movements and the slower drifts of population there are great differences regard to their value as diffusers of culture. A tribe that passes across the greater part of a continent in a few years may leave little trace along its path." Further (p. 221): "The movement of the Tupi between 1540 and 1549 across South America which has been mentioned was due to the mysterious attraction of the 'land where one does not die'. A later migration, affecting the Apapocuva, the Tanygua, and the Oguaiva tribes, was due to the same cause. To find the land of eternal youth these people left their homes about the upper Parana near the frontier between Paraguay and Brazil, and moved toward the shores of the Atlantic. The movement began in 1820 and lasted until 1912." If anything needs to be demonstrated and proved, it is certainly not the practical feasibility and likelihood of actual contact between early Mexico, Central America, and Peru, but rather the feasibility and likelihood of the peoples and cultures in these localities, being able to isolate themselves securely within their own borders, from the day megalithic art and white and bearded culture-heroes were first thought of in the respective regions, until our own race "discovered" America at the time of Columbus.

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[1] Nuñez Cabeza de Vaca and three companions lost all their possessions in the surf on the coast of Florida, and for a period of eight years (1528—36) they walked unarmed, barefoot, and almost naked from one unknown Indian tribe to the next right across the continent. (See Bandelier [1905]. Zamara's original account was published in 1542.)

We shall return to this subject later, when we deal with the distribution of cotton, corn, and other crop plants. We may here only mention in passing that the creator of the world, and mythical 'father' of the white and bearded culture-hero Quetzalcoatl, was in Mexico called *Tonaca*, with the title 'tecutli' meaning chief or lord (*Ibid.*, p. 73), while Viracocha was worshipped under the name *Tonapa*. (Pachacuti 1620, p. 70, etc.) The apparent similarity between the names Tonaca and Tonapa does not speak in favour of an independent evolution of these white and bearded 'wanderers' in Mexico and Peru.

While it is true that the early American memories of white and bearded teachers have a distribution which concurs to a remarkable extent with the American distribution of sun-worship in the broader sense of the word, the question is whether the sun-worship is responsible for the distribution of the white and bearded men, or whether the latter are responsible for the distribution of sun-worship. We should not overlook the latter possibility.

Certain it is that if we take a brief survey of the movements of the white and bearded men they prove to be quite independent of the east to west movement of the sun, whereas they were very keen to *introduce* solar beliefs among the ignorant Indians wherever they came to settle and build, and to make them realize that, as earthly servants and children of the sun, they were themselves to be obeyed and worshipped and given all the material goods due to the god himself and his divine hierarchy.

Quetzalcoatl, the Viracocha of the Aztecs

If we turn to Mexico for a brief comparison, we find that the Aztecs speak of *Quetzalcoatl* as the Incas spoke of *Viracocha*. He was remembered in the Aztec period from Anahuac in Texas to the borders of Yucatan. It may be somewhat misleading to consider a reference to any of these religious and symbolic names as pertaining to one single mythical deity only. Originally, Quetzalcoatl as well as Viracocha seems to have been the hereditary name of a hierarchical sequence, worshipping and claiming descent from a supreme god of the same name. Only with time have all Quetzalcoatls, like all Viracochas, been amalgamated into one single historic deity—god and creator as well as human culture-hero and mortal benefactor.

The religious and symbolic term *Quetzalcoatl* was neither restricted to one individual in Mexico, nor, probably, was it in its origin a personal name. Often translated freely as the "Plumed Serpent-God", Quetzalcoatl is a composite term. *Quetzal* is the resplendent and highly esteemed Mexican bird *Trogon splendens*, whose precious plumes distinguished ceremonial feather head-dresses like those worn by royalty and chiefs. *Coatl* is the serpent and the sacred symbol of light and divinity (*cohuatl*). Thus we shall see that, unlike Viracocha, Quetzalcoatl did not "walk on the sea," but he travelled along the coast on "a magic raft of serpents."

As Brinton stresses (1882 pp. 73, 82), we have to distinguish between the original Quetzalcoatl, as the invisible and eternal god, and the hierarch Quetzalcoatl, his human high priest and representative on earth: "In the ancient and purely mythical narrative, Quetzalcoatl is one of four divine brothers, gods like himself, born in the uttermost or thirteenth heaven to the infinite and uncreated deity, which, in its male manifestations, was known as *Tonaca tecutli*, Lord of our Existence, ..." Further: "But it was not Quetzalcoatl the god, the mysterious creator of the visible world, on whom the thoughts of the Aztec race delighted to dwell, but on Quetzalcoatl, high priest in the glorious city of Tollan (Tula), the teacher of the arts, the wise law-giver, the virtuous prince, the master builder and the merciful judge."

After this first immigrant priest-king and his god, the chief or superior of his high Toltec priests later bore the same name Quetzalcoatl. Thus the term takes the form of a hereditary title as much as a personal name. As contrary to his heavenly namesake, the ecclesiastical leader Quetzalcoatl was distinctly human, arriving upon a voyage from a former residence referred to as Tula. He was no light ray, but remembered as "a white man with long dark hair and flowing beard, dressed in a strange dress, who came accompanied by builders, painters, astronomers, and handicraftsmen to Anahuac,—made roads, humanised the people, and civilized them, and then disappeared." (Allen 1884.)

Brinton (1882, p. 89) states: "The origin of the earthly Quetzalcoatl is variously given; one cycle of legends narrates his birth in Tollan in some extraordinary manner; a second cycle claims that he was not born in any country known to the Aztecs, but came to them as a stranger.

"Of the former cycle probably one of the oldest versions is that he was a son or descendant of Tezcatlipoca himself, under his name Camaxtli. ... Another myth represents him as the immediate son of the All-Father Tonaca tecutli, under his title Citlallatonac, the Morning, by an earth-born maiden in Tollan. ...

"The second cycle of legends disclaimed any miraculous parentage for the hero of Tollan. Las Casas narrates his arrival from the East, from some part of Yucatan he thinks, with a few followers, a tradition which is also repeated with definitiveness by the native historian Alva Ixtlilxochitl, but leaving the locality uncertain. The historian, Veytia, on the other hand, describes him as arriving from the North, a full grown man, tall of stature, white of skin, and full-bearded, barefooted and bareheaded, clothed in a long white robe strewn with red crosses, and carrying a staff in his hand."

Diego Duran, quoted by Brinton (*Ibid.*, p. 66), describes the beard of Quetzalcoatl as long and between grey and red in colour. ("*La barba longa entre cana y roja*...")

The people of Quetzalcoatl were the Toltecs, also claimed by Aztec tradition to be tall in stature and light of skin, like their leader. (*Ibid.*, p. 88.)

According to tradition, the warlike behaviour of the local Indians, and the hostility of certain chiefs, made Quetzalcoatl prepare a return voyage to Tula Tlapallan, his own ancestral habitat. Brinton (*Ibid.*, p. 88) says:

"When Quetzalcoatl left Tollan most of the Toltecs had already perished by the stratagems of Tezcatlipoca, and those that survived were said to have disappeared on his departure. The city was left desolate, and what became of its remaining inhabitants no one knew. But this very uncertainty offered a favourable opportunity for various nations, some speaking Nahuatl and some other tongues, to claim descent from this mysterious, ancient and wondrous race.

"The question seems, indeed, a difficult one. When the Light-God disappears from the sky, shorn of his beams and bereft of his glory, where are the bright rays, the darting gleams of light which erewhile bathed the earth in refulgence? Gone, gone, we know not whither." And (p. 104): "To this it may be objected that the legend makes Quetzalcoatl journey toward the East, and not toward the sunset. The explanation of this apparent contradiction is easy... The Light-God most necessarily daily return to the place whence he started."

This is the point were the light-ray theories behind the Toltecs and Viracochas collide and collapse. Viracocha and his followers, and Quetzalcoatl and his men, broke up and left in opposite directions. We learn of Quetzalcoatl's departure (*Ibid.*, p. 115):

"Thus he passed from place to place, with various adventures... At length he arrived at the sea coast where he constructed a raft of serpents, and seating himself on it as in a canoe, he moved out to sea. No one knows how or in what manner he reached Tlapallan."[1] Further:

The legend which appears to have been prevalent in Cholula was somewhat different. According to that, Quetzalcoatl was for many years Lord of Tollan, ruling over a happy people. At length, Tezcatlipoca let himself down from heaven... which so frightened the populace that they fled in such confusion and panic that they rushed over the precipice and into the river, where nearly all were killed by the fall or drowned in the waters. Quetzalcoatl then forsook Tollan, and journeyed from city to city till he reached Cholula, where he lived twenty years. He was at that time of light complexion, noble stature, his eyes large, his hair abundant, his beard ample and cut rounding. In life he was most chaste and honest... The twenty years past, Quetzalcoatl resumed his journey, taking with him four of the principal youths of the city. When he had reached a point in the province of Guazacoalco, which is situated to the southeast of Cholula, he called the four youths to him, and told them they should return to their city; that he had to go further; but that they should go back and say that at some future day white and bearded men like himself would come from the east, who would possess the land.[1]

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[1] "These myths are from the third book of Sahagun's *Historia de las Cosas de Nueva España.* They were taken down in the original Nahuatl, by him, from the mouth of the natives, and he gives them word for word, as they were recounted." (*Ibid.*)

"Thus he disappeared, no one knew whither. But another legend said that he died there, by the seashore, and they burned his body. Of this event some particulars are given by Ixtlilzochitl, as follows: —

"Quetzalcoatl, surnamed Topiltzin, was lord of Tula. At a certain time he warned his subjects that he was obliged to go 'to the place whence comes the Sun,' but that after a term he would return to them, in that year of their calendar of the name *Ce Acatl*, One Reed, which returns every fifty-two years. He went forth with many followers, some of whom he left in each city he visited. At length he reached the town of Ma Tlapallan. Here he announced that he should soon die, and directed his followers to burn his body and all his treasures with him. They obeyed his orders, and for four days burned his corpse, after which they gathered its ashes and placed them in a sack made of the skin of a tiger (*ocelotl*)."

The seashore death and cremation of one of the wandering Quetzalcoatls, surnamed Topiltzin, did not end their lineage, and we may well surmise that a new Quetzalcoatl arose among those of his kin who attended the funeral ceremony. Whether the succeeding Quetzalcoatl, with his surviving disciples, continued the journey east by land into Yucatan, or whether the high priest embarked on a "magic raft" in the Gulf of Mexico, is of minor significance as long as traditions agree that the Mexican viracochas left in an easterly direction towards Yucatan.[2] It is certain that, if not the same, at least a suspiciously similar stock of culture-bearers have been busy also in the minds of the nearest civilized neighbours of the Aztecs to the east, the Mayas of Yucatan. Regardless of their original chronology in these two American areas, the probability of transfer of these culture-bearers or their conceptions one way or the other looms large.

Itzamná Canil and the Great Arrival in Maya history

We may again quote Brinton (*Ibid.*, p. 145), whose careful procedure was first to collect and compare— and next to try to account for—the conceptions of Caucasian-like spreaders of culture among the early American centres of civilization. He says:

"There appear to have been two distinct cycles of myths in Yucatan, the most ancient and general that relating to Itzamná, the second, of later date and different origin, referring to Kukulcan. It is barely possibly that these may be different versions of the same; but certainly they were regarded as distinct by the natives at and long before the time of the Conquest.

"This is seen in the account they gave of their origin. They did not pretend to be autochthonous, but claimed that their ancestors came from distant regions, in two bands. The largest and most ancient immigration was from the East, across, or rather through, the ocean—for the gods had opened twelve paths through it— and this was conducted by the mythical civilizer Itzamná. The second band, less in number and later in time, came in from the West, and with them was Kukulcan. The former was called the Great Arrival; the latter, the Lesser Arrival...

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[1] "For this version of the myth, see Mendieta, *Historia Eclesiastica Indiana*, Lib. II, caps. V and X." (*Ibid.*)

[2] Brinton (*Ibid.*, p. 133) writes: "Quetzalcoatl was gone. Whether he had removed to the palace prepared for him in Tlapallan, whether he had floated out to sea on his wizard raft of serpent skins, or whether his body had been burned on the sandy sea strand and his soul had mounted to the morning star, the wise men were not agreed. But on one point there was unanimity. Quetzalcoatl was gone; but *he would return.*"

"To this ancient leader, Itzamná, the nation alluded as their guide, instructor and civilizer. It was he who gave names to all the rivers and divisions of land; he was their first priest, and taught them the proper rites wherewith to please the gods and appease their ill-will; he was the patron of the healers and diviners, and had disclosed to them the mysterious virtues of plants...

"It was Itzamná who first invented the characters or letters in which the Mayas wrote their numerous books, and which they carved in such profusion on the stone and wood of their edifices. He also devised their calendar, one more perfect even than that of the Mexicans, though in a general way similar to it.[1] Thus Itzamná, regarded as ruler, priest and teacher, was, no doubt, spoken of as an historical personage, and is so put down by various historians, even to the most recent."[2]

But as with Viracocha and Quetzalcoatl, we suspect a lineage rather then an historic person in this cultured migrant, since hé, too, has inherited the name of the creator whom he represents on earth. (*Ibid.*, p. 147.) An important surname of Itzamná is *Canil.* (See further Part X.)

As shown by Morley (1946, p. 222) in his *Ancient Maya*, Itzamná was occasionally remembered as being bearded.

Kukulcan the Viracocha of the Mayas

After this Great Arrival came the Lesser (*Ibid.*, p. 159):

"The second important hero-myth of the Mayas was that about Kukulcan. This is in no way connected with that of Itzamná, and is probably later in date, and less national in character. ...

"The natives affirmed, says Las Casas, that in ancient times there came to that land twenty men, the chief of whom was called 'Cocolcan,' ... They wore flowing robes and sandals on their feet, they had long beards, and their heads were bare. They ordered that the people should confess and fast...

"Kukulcan seems, therefore, to have stood in the same relation in Yucatan to the other divinities of the days as did Votan in Chiapa and Quetzalcoatl Ce Acatl in Cholula."[3]

We learn from Brinton (*Ibid.*, p. 162) that Kukulcan was one of four 'brothers', each ruling his own tribe. One of the others having died or departed, and two been put to death, only Kukulcan remained. He instructed the people in the arts of peace, and caused various important edifices to be built at Chichen Itza. He also founded and named the city of Mayapan.

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[1] "The authorities on this phase of Itzamna's character are Cogolludo, *Historia de Yucatan*, Lib. IV, cap. III; Landa, *Cosas de Yucatan*, pp. 285, 289, and Beltran de Santa Rosa Maria, *Arte del Idioma Maya*, p. 16. The latter has a particularly valuable extract from the now lost Maya Dictionary of F. Gabriel de San Buenaventura." (*Ibid.*)

[2] "Crescencio Carrillo, *Historia* Antigua de Yucatan, p. 144, Mérida, 1881." (*Ibid.*)

[3] Renaud (quoted: Southwestern Lore, p. 23) identifies Kukulkan directly with Quetzalcoatl: "Kukulkan, the Toltec Quetzalcoatl, went to Yucatan where he became a wise ruler, an organizer, a builder of cities and temples and a cultural hero. Finally, the Maya accepted him as a great divinity, a solar god, parallel to their own god Itzamna."

"Under the beneficent rule of Kukulcan, the nation enjoyed its halcyon days of peace and prosperity. The harvests were abundant and the people turned cheerfully to their daily duties, to their families and their lords. They forgot the use of arms, even for the chase, and contended themselves with snares and traps."

The mere idea of Maya tradition inventing such a peaceloving doctrine as the mental characteristic of this immigrant priest-king is as surprising as is the insistence on the loose robe and the flowing beard of this cultured wanderer and his score of bearded followers who entered Yucatan from the west. Nevertheless his humanitarian teachings and activities concur completely with those of Quetzalcoatl, who led his band of followers out of Mexico towards Yucatan, or to the east, and promised that at some future day white and bearded men like himself would come back from that direction. For, of Quetzalcoatl Aztec tradition tells us (*Ibid.*, p. 116) that:

"...he forbade the sacrifice either of human beings or the lower animals, teaching that bread, and roses, and flowers, incense and perfumes, were all that the gods demanded; and ... he forbade, and did his best to put a stop to, wars, fighting, robbery, and all deeds of violence. For these reasons he was held in high esteem and affectionate veneration, not only by those of Cholula, but by the neighbouring tribes as well, for many leagues around. Distant nations maintained temples in his honour in that city, and made pilgrimages to it, on which journeys they passed in safety through their enemy's countries."

Brinton (*Ibid.*, p. 164), following Pio Perez, also shows that one of the Maya chronicles "opens with a distinct reference to Tula and Nonoal, names inseparable from the Quetzalcoatl myth. ... The probability seems to be that Kukulcan was an original Maya divinity, one of their hero-gods, whose myth had in it so many similarities to that of Quetzalcoatl that the priests of the two nations came to regard the one as the same as the other."

It is at least interesting to note that Kukulcan is simply a translation of Quetzalcoatl. *Kukul* is the Maya term for the *Quetzal*-bird, and *kan* is a serpent. (Verrill 1929, p. 101.)

Since Yucatan juts out as a peninsula into the Mexican Gulf, a terrestrian or coastal migrant cannot pass further east unless he enters the open ocean. And, whereas Quetzalcoatl disappeared on an eastward raft voyage from Mexico proper towards Yucatan, so Kukulcan finally left on a westward journey from Yucatan, which would necessarily take him back to Mexico or else down the Central American isthmus (*Ibid.*, p. 163): "At length the time drew near for Kukulcan to depart. He gathered the chiefs together and expounded to them his laws. From among them he chose as his successor a member of the ancient and wealthy family of the Cocoms. His arrangements completed, he is said, by some, to have journeyed westward, to Mexico, or to some other spot toward the sun-setting."

Votan, bringer of culture to the Tzendals

Since a westward migrant from Yucatan would necessarily enter the habitat of the Tzendals, whose home was in Tabasco and Chiapas, it may be interesting to see what can be found in Tzendal legends. Brinton (1882, p. 212) shows how Tzendal traditions are centred around the arrival of a foreign culture-hero referred to as Votan or *Uotan*, in Tzendal literally "the heart," from the Maya root-word *tan*, which means primarily "the breast". The Votan myth was originally told in the Tzendal tongue by a Tzendal native, and the manuscript of five or six folios came into the possession of Nuñez de la Vega, Bishop of Chiapas, about 1690. Brinton says:

"Few of our hero-myths have given occasion for wilder speculation than that of Votan...

"At some indefinitely remote epoch, Votan came from the far East. He was sent by God to divide out and assign to the different races of men the earth on which they dwell, and to give to each its own language. The land whence he came was vaguely called *ualum uotan*, the land of Votan. His message was especially to the Tzendals. Previous to his arrival they were ignorant, barbarous, and without fixed habitations. He collected them into villages, taught them how to cultivate the maize and cotton, and invented the hieroglyphic signs, which they learned to carve on the walls of their temples. It is even said that he wrote his own history in them. He instructed civil laws for their government, and imparted to them the proper ceremonials of religious worship. For this reason he was also called 'Master of the Sacred Drum', the instrument with which they summoned the votaries to the ritual dances. They especially remembered him as the inventor of their calendar. His name stood third in the week of twenty days, and was the first Dominical sign, according to which they counted their year, corresponding to the *Kan* of the Mayas. As a city-builder, he was spoken of as the founder of Palenque, Nachan, Huehuetlan—in fact, of any ancient place the origin of which had been forgotten...

"Votan brought with him, according to one statement, or, according to another, was followed from his native land by, certain attendants or subordinates, called in the myth *tzequil*, petticoated, from the long and flowing robes they wore. These aided him in the work of civilization. On four occasions he returned to his former home, dividing the country, when he was about to leave, into four districts, over which he placed these attendants.

"When at last the time came for his final departure, he did not pass through the valley of death, as must all mortals, but he penetrated through a cave into the under-earth, and found his way to 'the root of heaven'. With this mysterious expression, the native myth closes its account of him."

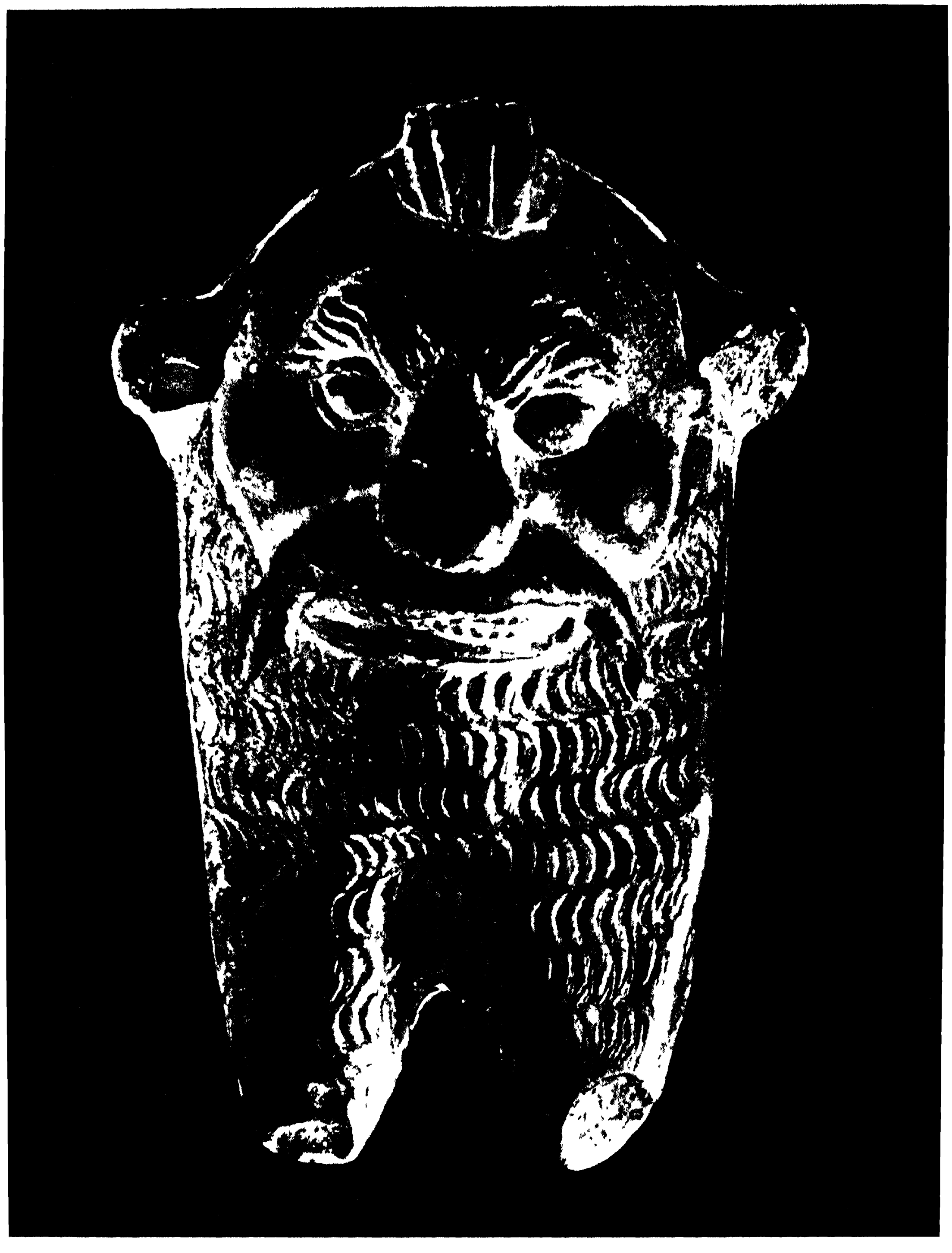
Further (*Ibid.*, p. 215): "According to an unpublished work by Fuentas, Votan was one of four brothers, the common ancestors of the southwestern branches of the Maya family. All these traits of this popular hero are too exactly similar to those of the other representatives of this myth, for them to leave any doubt as to what we are to make of Votan. Like the rest of them, he and his long-robed attendants are personifications of the eastern light and its rays." (*Sic!*)

Condoy, culture-bringer to the Zoques

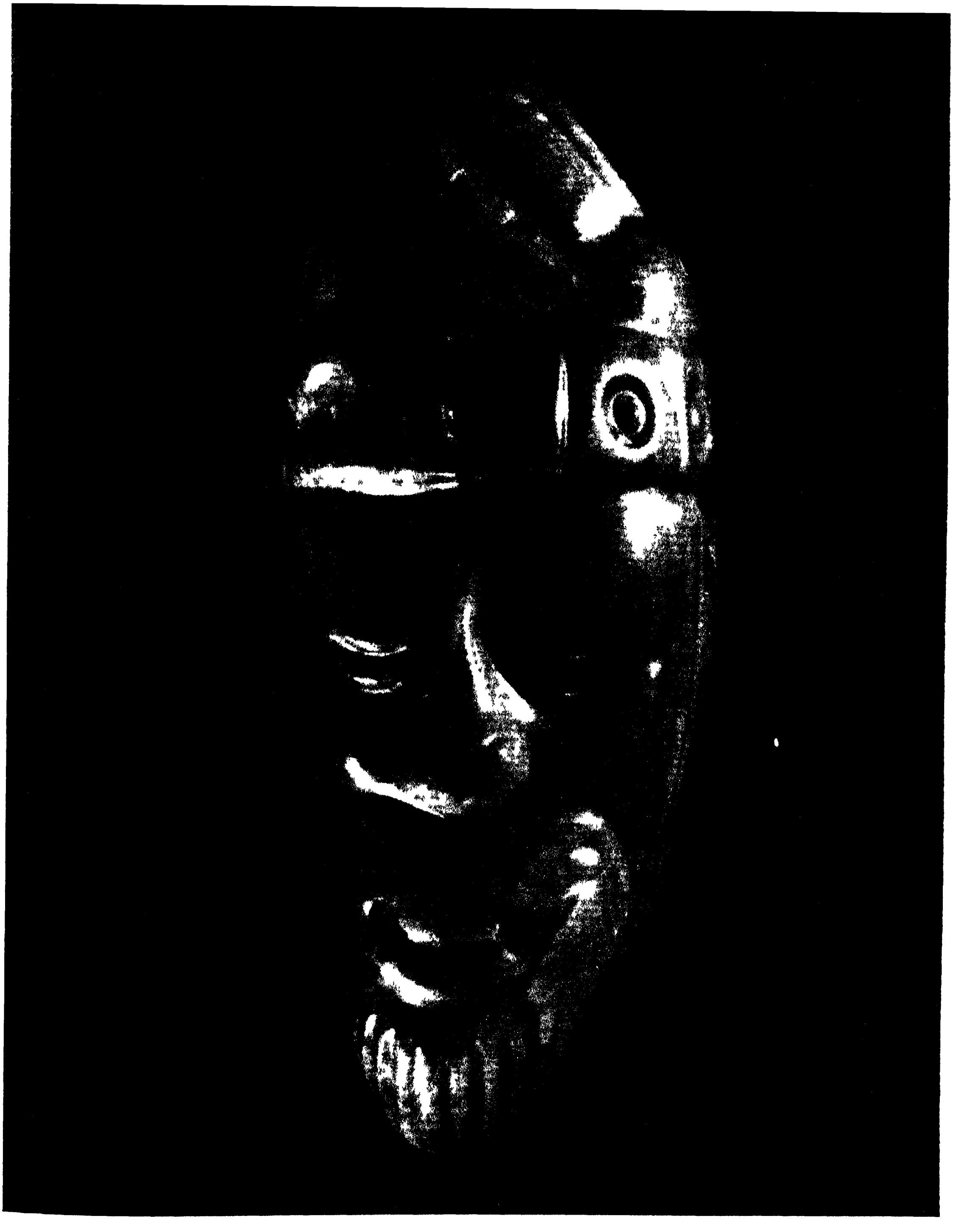
When he left the lofty plateaux and sierras of Chiapas, Votan went neither east like Quetzalcoatl nor west like the sun, but disappeared mysteriously through "a cave" into the "under-earth". Yet we do not have to climb further down than to the lowlands and the coastal area among the Zoques (*Ibid.*, p. 218) before he reappears:

"The Zoques, whose mythology we unfortunately know little or nothing about, adjoined the Tzendals, and were in constant intercourse with them. We have but faint traces of the early mythology of these tribes; but they preserved some legends which show that they also parttook of the belief, so general among their neighbors, of a beneficent culturegod.

The sheltered underside of a large stela excavated in the Tabasco jungle revealing a strangely Caucasian-like face with flowing beard. "His aquiline nose and aristocratic features were different from all other faces depicted at the site." (Stirling 1940, p. 327.) (From *National Geographic Society-Smithsonian Inst. Arch. Exp. to S. Mexico, 1939-40.*)



Bearded pottery head of pre-Columbian origin. From Rio Balsas, Guerrero, Mexico. (Photo: *Amer. Mus. Nat. Hist.*)



adeite head representing the bearded culture hero Quetzalcoatl, Mexico. (Photo: *Musée de l'Homme, Paris.*)

1 Clay head from Tres Zapotes, Vera Cruz, Mexico. (Photo: *N. G. S.* From *National Geographic Society-Smithsonian Inst. Arch. Exp. to S. Mexico, 1939-40.*)

2 Low relief carved on back of prehistoric stone mirror from Vera Cruz, Mexico. (Photo: *Amer. Mus. Nat. Hist.*)

This myth relates that their first father, who was also their Supreme God, came forth from a cave in a lofty mountain in their country, to govern and direct them... They did not believe that he had died, but that after a certain length of time, he, with his servants and captives, all laden with bright gleaming gold, retired into the cave and closed its mouth, not to remain there, but to reappear at some other part of the world and confer similar favors on other nations. The name, or one of the names, of this benefactor was Condoy, the meaning of which my facilities do not enable me to ascertain."

Vestiges of the wanderer through Central America

South or east along the isthmus from Tzendal territory live the Kiches of Guatemala (*Ibid.*, p. 210), who were not distant relatives of the Mayas of Yucatan. Their mythology has been preserved in a rescript of their national book, the *Popol Vuh.* They were well acquainted with the "wanderer," who seemed to have passed through their territory more than once. He was known in Guatemala under various names, one of which was Gucumatz. Under the name of Xbalanque he had been down in the "Underworld" fighting on behalf of the Kiches against the powerful enemies ruling there, beneath their lofty mountain plateaux: "On his return, he emerged from the bowels of the earth and the place of darkness, at a point far to the east of Utatlan, at some place located by the Kiches near Coban, in Vera Paz, and came again to his people, looking to be received with fitting honors. But like Viracocha, Quetzalcoatl, and others of these worthies, the story goes that they treated him with scant courtesy, and in anger at their ingratitude, he left them forever, in order to seek a nobler people."

Leaving Mexico proper, Yucatan, Tabasco, Oaxaca, Chiapas, and Guatemala, the "wanderer" had apparently little choice but to transfer his activities further down the Isthmus. Although legend may here be less informative, the portraits of strangely bearded men which crop up first on Salvador pottery (Lehmann 1924, p. 39), and next on the monuments of the megalithic high culture site at Coclé in Panama (Verrill 1929, p. 81), leave no doubt as to similar worship having taken place there. And no sooner do we leave the deserted site at Coclé, and enter Colombia with the surviving Chibcha culture, than the vivid memories of white and bearded culture-bringers spring up to meet us anew.[1]

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[1] Before we leave Panama, however, we may note some distorted fragments of myths among the interesting Cuna people who live on the Isthmus just where Colombia and the Southern continent begin. Stout (1950, p. 267) writes of the Cuna: "Knowledge of the medicines and medicine chants, the girls' ceremony chants, and the mythology is in the care of the various types of medicine men and the ceremonial leaders. It is all passed on to their pupils during long courses of training for which the pupils pay in labor and goods. Familiarity with this body of knowledge brings considerable prestige and is prerequisite to being elected chief or second chief." As is so common among the people of the New World, the Cuna begin their history with the creation of the world by a god, who later "destroyed the world by fire, darkness, and flood because the people sinned." According to Stout (*Ibid.*), this flood occurred several centuries ago, "and after it there appeared a great personage who came to earth on a plate of gold and tought the people how to behave, what to name things, and how to use them. He was followed by a number of disciples who spread his teachings, and who, in turn, were followed by ten great shamans, one of them a woman. These shamans had great powers over the elements. They investigated the underworld and heavens and discovered many medicines. These exploits grade into accounts of legendary chiefs and heroes who led the *Cuna* in their wars with the Spaniards and who led whole villages of the *San Blas Cuna* down from the mountains and out onto the islands."

Bochica, the Viracocha of the Chibchas

The peaceful and highly organized Muyscas, or Chibchas, lived in the lofty plateau of the Northern Andes, where they had found a better climate and an altogether more favourable residence than in the swampy jungle-areas along the lowland coasts of Panama and Colombia whence their ancestors must once have arrived. Their high cultural level and social standing place them, with the early Mexicans and Peruvians, among the most outstanding nations of aboriginal America. Their traditional history attributes their ancestors' cultural teaching to a foreign immigrant generally referred to as Bochica, Nemterequetaba, or Xue, who is said to have come from the east and to have entered the territory of Bogota at Pasca on its southern border. (Joyce 1912, p. 12.)

"North of Peru, the Muysca Indians of the plain of Cundinamarca in Colombia had a legend of one called Bochica, a white man with a beard, who appeared suddenly amongst them, while savages, and taught them how to build and sow, and formed them into communities, settling their government." (Allen 1884; see also Stevenson 1825, Vol. I, p. 398.)

To return to Brinton's Hero Myths, he writes of the Muyscas (1882, p. 220): "The knowledge of these various arts they attributed to the instructions of a wise stranger who dwelt among them many cycles before the arrival of the Spaniards. He came from the east, from the llanos of Venezuela or beyond them, ... His hair was abundant, his beard fell to his waist, and he dressed in long and flowing robes. He went among the nations of the plateaux, addressing each in its own dialect, taught them to live in villages and to observe just laws. Near the village of Coto was a high hill held in special veneration, for from its prominent summit he was wont to address the people who gathered round its base. ... For many years ... did he rule the people with equity, and then he departed, going back to the East whence he came, said some authorities, but others averred that he rose up to heaven. At any rate, before he left, he appointed a successor in the sovereignty, and recommended him to pursue the paths of justice.[1] ...

"That this culture-hero arrives from the East and returns to the East are points that at once excite the suspicion that he was the personification of the Light. But when we come to his names, no doubt can remain. These were various, but one of the most usual was *Chimizapagua*, which, we are told, means 'a messenger from *Chiminigagua*.' In the cosmogonical myths of the Muyscas this was the home or source of Light, and was a name applied to the demiurgic force. ... Modern grammarians profess themselves unable to explain the exact meaning of the name *Chiminigagua*, but it is a compound, in which, evidently, appear the words *chie*, light, and *gagua*, Sun.

"Other names applied to this hero-god were Nemterequeteba, Bóchica, and Zuhe, or Sua, the last mentioned being also the ordinary word for the Sun. He was reported to have been of light complexion, and when the Spaniards first arrived they were supposed to be his envoys, and were called *sua* or *gagua*, just as from the memory of a similar myth in Peru they were addressed as Viracochas."[2]

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[1] "Lucas Fernandez Piedrahita, *Historia General de las Conquistas del Nuevo Reyno de Granada*, Lib. I, cap. III, Amberes, 1688." (*Ibid.*)

[2] "The principal authority for the mythology of the Muyscas, or Chibchas, is Padre Pedro Simon, *Noticias Historiales de las Conquistas de Tierra Firme en el Nuevo Reyno de Granada*, Pt. IV, caps. II, III, IV, printed in Kingsborough *Mexican Antiquities*, Vol. VIII, and Piedrahita as above quoted." (*Ibid.*)

Zume, culture-bringer east of the Andes

If this Bóchica, or Zuhe, or Xue, actually entered the territory of Bogota from the east or from the llanos of Venezuela, there is every reason to associate him, or his lineage, with the legendary Tsuma or Zume, a colleague wanderer and teacher whose memory was venerated among the aboriginal Indians of Venezuela when Europeans arrived. In fact, although rarely if ever remembered as settling anywhere for any length of time, as among the Aztec, Maya, Chibcha, and Inca ancestors, yet the same wandering high priest has occupied the minds of South American Indians over wide areas:

"Wherever the widespread Tupi-Guarani race extended—from the mouth of the Rio de la Plata and the boundless plains of the Pampas, north to the northernmost islands of the West Indian Archipelago—the early explorers found the natives piously attributing their knowledge of the arts of life to a venerable and benevolent old man whom they called 'Our Ancestor', *Tamu*, or *Tume*, or *Zume*. ...

"The legend was that Pay Zume, as he was called in Paraguay (Pay = magician, diviner, priest), came from the East, from the Sun-rising, in years long gone by. He instructed the people in the arts of hunting and agriculture, especially in the culture and preparation of the manioca plant, their chief source of vegetable food. Near the city of Assumption is situated a lofty rock, around which, says the myth, he was accustomed to gather the people, while he stood above them on its summit, and delivered his instructions and his laws, just as did Quetzalcoatl from the top of the mountain Tzatzitepec, the Hill of Shouting. ... He lived a certain length of time with his people and then left them, going back over the ocean toward the East, according to some accounts. But according to others, he was driven away by his stiff-necked and unwilling auditors, who had become tired of his advice. They pursued him to the bank of a river, and there, thinking that the quickest riddance of him was to kill him, they discharged their arrows at him." (*Ibid.*, p. 223.) But the fleeing culture-hero apparently caught the arrows in his hand and, by his own divine powers walked across the river and so disappeared from their view in the distance.[1]

Since from its seat in the Bolivian highlands the Tiahuanaco influence is traceable into the adjoining territories of northern Paraguay and also northern Argentine and Chile, one may well assume that individual 'envoys' or 'disciples' from this important cult-site had been active in wide areas of their own native continent. With this in mind it is not so surprising to find that the conception of the wandering teacher has been so well preserved in these far-flung localities. Bolivian highland myths are full of references to a teacher of culture who walked about among their villages and settlements without the slightest restriction of his movements to a line from east to west. We make a mistake if we think that the territories in which the cult- and culture-yielding wanderer is remembered are too vast for the energetic activity of one coherent group of men. The inhabitants of the plains and jungles of early America, accustomed to pace the landscape by steps or by paddle-strokes, did not consider the distances they had to cover nearly so great as they would seem to a twentieth century traveller if he was deprived of his train, car or plane and left to man's natural means of propulsion.

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[1] "...see Nicolao del Techo, *Historia Provinciæ Paraquariæ*, Lib. VI, cap. IV, 'De D. Thomæ Apostoli itineribus;' and P. Antonio Ruiz, *Conquista Espiritual hecha por los Religiosos de la Compañia de Jesus an las Provincias del Paraguay, Parana, Uruguay y Tape*, fol. 29, 30 (4to., Madrid 1639). The remarkable identity of the words relating to their religious beliefs and observances throughout this widespread group of tribes has been demonstrated and forcibly commented on by Alcide D'Orbigny, *L'Homme Americain*, Vol. II, p. 277." (*Ibid.*)

Conclusion

In closing our survey of the traditional references to the wandering teachers and institutors of culture in aboriginal America, we cannot leave out of sight the possibility that the great ecclesiastical centres between Mexico and Bolivia may have had individual messengers and disciples travelling far afield. There were indeed both religious fanatism and an expansionist tendency behind the hierarchic empires in question. Bancroft summed up the position in 1875: "All the myths relative to the founders of the different American civilizations make reference to persons who have the same characters. All are white, bearded, generally covered with long vestments; they appear suddenly and mysteriously . . . and disappear in a super-natural way."

The specified traditions of light-skinned and bearded founders of culture were most prominent and complete among the Aztec, Maya, Chibcha, and Inca nations, that is, among the natives with the highest cultural standing in the New World, and we have also ample evidence to verify that these historic nations really did owe their cultural standing to other people with even more impressive high-cultures, who had been active in just these same localities in earlier times. These original culture-bearers are known to us only through their archaeological remains, chiefly consisting of deserted ecclesiastical sites. It is noteworthy that all the known culture peoples concerned disclaim the honour of having constructed these monuments, or of having originated their own cultural standards, and give all the credit to foreign intruders remembered as having lighter skins than themselves, long beards, marked ecclesiastic interests and benevolent characters. These traditional teachers cannot have been "personified light rays", as they and their followers did not—as so frequently asserted—appear in the east and disappear in the west. True, the viracochas of Peru disappeared into the west, but from Ecuador, and upon a northward journey from Tiahuanaco and Titicaca Island. True, the Mexican Quetzalcoatl and his followers appeared from the east, but they disappeared towards the east also. And the Mayan Kukulcan and his followers came from the west, from the setting sun, and disappeared in the same direction. They are in all their nature human migrants, represented in native superstition as supernatural wanderers and messengers from the sun, rather than light-rays independently personified in the high-culture areas of early America as long-robed men with beards.

The evidence of archaeology

Leaving now the oral vestiges of the wanderer, we find supporting evidence in some of the prehistoric murals, pottery portraits, stone sculptures, and pre-Columbian Codices, all painted, moulded, carved, and written before Columbus and his followers affected aboriginal life in America, in certain cases even before the transfer of power from the primeval high-cultures to the subsequent Mayas, Aztecs, or Incas.

The possibility of a spread of culture between Mexico and Peru, and the local appearance in art representations of strongly bearded culture heroes, are respectively one of the most discussed and one of the most puzzling problems of American pre-history.

Some able observes of Peruvian antiquities, such as Tschudi (1851) and Angrand (1866), advanced at an early date the theory that aboriginal Peru had received cultured immigrants and inspirations directly from early Mexico. For many decades any claim of such or similar diffusion possibilities between pre-Columbian Peru and North or Central America were met with considerable scepticism. The Mexican and Central American authority Spinden (1917), although generally opposed to the importance of diffusion, was nevertheless among the first of contemporary scholars to accept the importance of a comparative study of the early culture-centres north and south of Panama. "It is surely significant" he says (*Ibid.*, p. 56), "that a stratification of human remains at Ancon, Peru, as explained by Dr. Max Uhle, shows plastic art in clay similar if not identical with that of Central American in the lowermost level." Yet, until very recent decades it has been the opinion of most followers of the contemporary school of anthropology that man, in all his local varieties, came to America as a savage barbarian, and that no important evolution began until he had spread as such, roughly speaking, to all his final destinations within the Americas. Many have even inclined to the belief that, from an archaic culture based on primitive hunting and collecting, high-culture with all its diversified aspects developed out of savage mentality and activities, each tribe and nation beginning from the bottom, independent of other American cultures, and developing analogous features merely through the parallel inclinations of human nature.

This theory is, to a greatly modified extent, still occasionally found today, although rapidly losing supporters. The danger of this hypothesis is, indeed, not that it is contrary to the universal claim of all the historically minded peoples of aboriginal America, but that it fails to find verification or support in archaeological material and excavation. Linné (1939, p. 3) says: "In the Valley of Mexico, the archaeologists have penetrated as far down as to the times of the primitive agriculturists, the so called archaic culture. Here, already, we are confronted with the peculiar phenomenon characteristic of America, that the cultures appear suddenly, quite readily formed and without strong relations between each others. Subsequently they develop further, within the limits of a narrow margin, then disappear to be succeeded by others. A new stock with other artistic intentions but in many ways with corresponding modes of living, weapons, and tools, have taken possession of the land."

This sudden appearance and disappearance of American culture in full bloom, and with such elaborate and intricate standards that we often find in subsequent periods signs of retrogression or cultural decay rather than a maintenance of the original knowledge and achievements, is as typical of high-cultures of South America as of those of Mexico and Yucatan. If each of these American cultures and civilizations had been independently developed by the savages within its own area, one would expect, at least in some localities, to find traces of a slow evolution from low and primitive forms. But as we do not, we should at least simplify our problems by admitting the possibility that high-culture may have been developed by aboriginals in one area and spread as an inspiration to others.

Among the contemporary Peruvian archaeologists who have realized these apparent difficulties and drawn the natural conclusions is Kroeber (1925, 1930 b, 1945). As long ago as 1925 (p. 212) he suggested, from evidence found in Moche pottery of north coastal Peru, that this territory had received impulses from the Isthmus or Mexico. In 1930 he argues for further connection between the two areas in his paper "Cultural Relations between North and South America." Analyzing the cultural structures and their relations between these two adjoining sections of the New World, he finds a fundamental unity underlying the Mexican and Peruvian conceptions and products, saying: "There is too much in common to believe otherwise."

As is well known, *it is easier to distinguish and separate cultures by sorting out the patterns and colours of pottery than it is to search behind the discriminating details for some measure of common origins and wider unity*. We cannot successfully use the same procedure for uniting the cultures as we use for discriminating between them. Kroeber (*Ibid.*, p. 20) clearly demonstrates this by stressing that the differentiation in styles and forms is no evidence against there being a common inspiration behind the Mexican and Peruvian high-cultures. "Many Mexican peoples, the Maya and Tarasca for instance, differ," he says, "almost as much among themselves."

In addition to the material culture traits which he found to have spread throughout the whole region between the lakes of Tezcoco in Mexico and Titicaca in Peru-Bolivia, Kroeber further points out "the myth of the departing bearded culture institutor." He regards the Peruvian cultures probably a little younger than the Mexican, but: "In each case the culture meets us full blown." As no subsequent evidence has seriously challenged Kroeber's view, we may well bear in mind the possibility that the traditions of the small groups of *wandering* institutors of culture might have spread locally through *wanderings* rather than through independent conceptions along their routes. We shall therefore analyse some archaeological evidence that may serve to throw further light on the bearded migrants of the Tici-Viracocha class.

Light hair and beards painted in Mexican codices before Columbus

Of the numerous hand-written codices or books which fell into the hands of the early Spaniards upon the conquest of Mexico, the vast majority were solemnly burned by the Spanish priests on open bonfires in the village streets. But from the few that escaped destruction, we learn that the idea of light hair and beard did not enter America with Columbus. Thus, in the *Tonalamatl* of the Aubin collection[1]—a pre-Columbian codex preserved in the National Library in Paris—the aboriginal Mexican authors have left us with multicoloured hand-paintings of former heroes and deities. Of some 275 human heads with their hair clearly drawn, more than a hundred appear with hair of a light brown colour, the rest having black or very dark hair.

Beards are drawn in several codices. Thus in *Codex Vaticanus* 3773, another pre-Columbian book from Mexico and in Anahuac hand-writing, eleven men with realistic, unmistakeable beards are represented. Humboldt (1810, p. 47, 48) reproduces about a dozen other bearded men from the hieroglyphic paintings in the Mexican manuscript preserved in the Imperial Library of Vienna.

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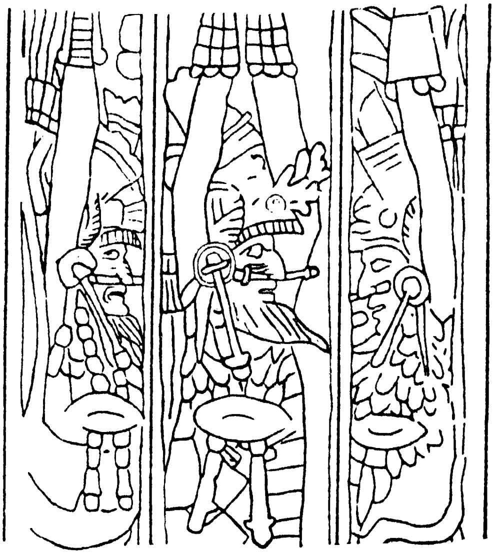
[1] See bibliography: Codex Tonalamatl Aubin.

Race traits depicted in Yucatan art

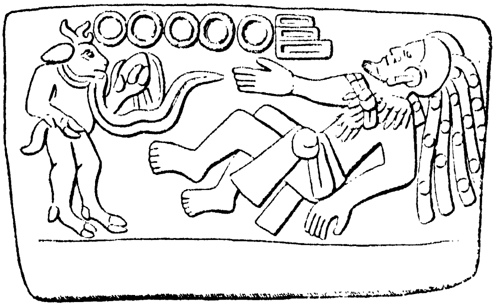


It is well known that we find pre-Columbian stone-carvings of bearded and whiskered men among the human portraits in early Yucatan. (Holmes 1919, p. 26.) In the ruins of Chitzen Itza, the centre of Kukulcan's activities before the founding of Mayapan, bearded figures carved in relief are quite frequent. (Seler 1910.) One of these, carved on a pilaster of the south jamb of the entrance door to the Temple of the Warriors, is reproduced here as drawn by Morris, Charlot, and Morris (1931, Pl. 40). Another is reproduced in Plate XXI **1**.

Verrill (1929, p. 137), referring to the holy city of Chitzen Itza—dedicated by the Mayas to Kukulcan—says: "...its 'Temple of the Jaguars' surpasses any other known prehistoric structure in its beauty of design, its impressive carvings, its magnificent coloring and its wonderful frescoes. ... Among the innumerable bas-reliefs, which cover both the exterior and interior of the temple, are many figures of bearded men. It has been suggested that these represent priests of Kukulcan or the 'Plumed-Serpent-god', who was always depicted with a beard, the supposition being that his priests either wore real beards or donned artificial ones. But is it not equally probable that these bearded figures represent those mysterious 'bearded ones' who, according to Mayan, Aztecan and Incan legends, visited America ages before the coming of the Spaniards? There is a remarkable frequency of bearded gods and figures in both Mayan and Aztec sculptures and art, and at Itzamak the figure of Hunpictok (commander-in-chief of eight thousand flints) shows a moustached man where it is carved on the stones of his palace. In many places, too, human beings are shown with remarkable flat-topped heads, and it is a most interesting and suggestive fact that most of the monolithic statues or idols discovered at the Coclé temple site in Panama had precisely the same flat-topped craniums, and that several had beards."

Pre-Columbian frescoes of a marine battle with a fair-haired race

In their richly illustrated and exhaustive study of *The Temple of the Warriors at Chitzen Itza, Yucatan*, Morris, Charlot, and Morris (1931) take up for discussion the fact that more than one race of men is depicted in the important frescoes on the interior walls. They stress, in several places, the exactness with which the ancient artists have striven to depict and emphasize the racial characteristics and distinctions of their models. Thus (*Ibid.*, p. 443): "Many of the Spanish writers recorded comments on the Maya as they appeared at the time of the Conquest, which, when compared with the material in the present volume, give striking corroborative proof of the exactness with which Maya representational art



Stone relief from Cozumalhuata in Guatemala. (From Krickeberg 1950.)

followed the original models." This testimony increases the interest attaching to the artist's effort to depict for posterity an unidentified tribe or race, produced in the midst of the usual Maya paintings.

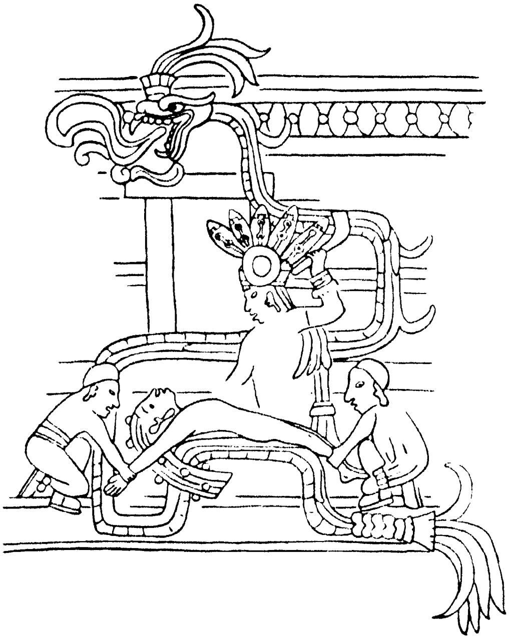
Morris, Charlot, and Morris (*Ibid.*, Vol. II, Pl. 147) append the following caption to a reproduction of one of the principal mural paintings in the temple:

"The section of the wall which was found in situ portrayed a sea battle wherein black warriors were victorious over a fair-skinned folk having long yellow hair studded with green beads." Also (*Ibid.*, Plate 146): "Murals from Areas 19 to 21 depict a series of relating episodes concerning a fair-skinned people with flowing yellow hair, defeated in battle and subsequently sacrificed by conventionally equipped blackskinned warriors. The unusual characteristics of the former group, a member of which is here represented in seeking escape by swimming, gives rise to much interesting speculation as to their identity." (See Plates XXIX—XXXII.)

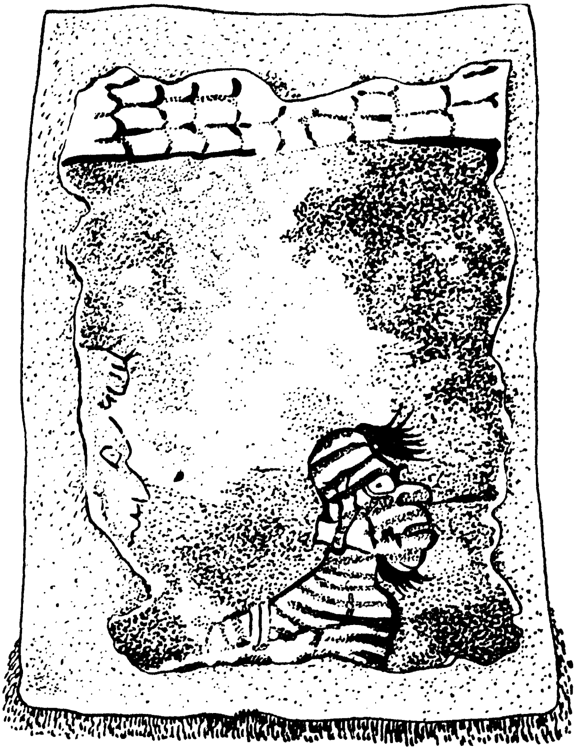
Further (*Ibid.*, p. 444): "Figure 300 c exemplifies an exceedingly interesting type of unfortunates who are being overwhelmed by armed men in Areas 20 to 21, and who later are sacrificed in Area 19. The figures possess neither clothing nor weapons, and, aside from the rather unusual circumstance of appearing with unpainted, natural, light-colored skins, they have extraordinary yellow hair, very long and thick and always twined with green beads. The burlesqued countenance, distorted with anguish, is a usual captive feature, and the deformed skull again suggests a Maya. It is difficult however, to reconcile all of these physical qualities with a member of that race. The painter, in depicting the hair and skin with such care in order to contrast them with their black-painted armed captors, evidently had some notion of a distinct physical difference in his two sets of actors."

The artist's preservation of a race of light-skinned, fair-haired men is not the only interesting fact; the whole scene in which these strange people are involved is most remarkable (*Ibid.*, p. 398): "Upon the surface of the waves, a lively scene of combat was taking place between conventionally garbed black-skinned warriors and a red people with long, flowing, yellow hair. The scattered stones from the fallen portions of the section give additional details of this battle. The aquatic part of the picture would seem to have extended. . . from the southeast corner of the front room, two-thirds of the distance toward the central doorway. The final third, lying to the left of the marine section, contained one of the most interesting frescoes in the entire temple—that of the formal consummation of a human sacrifice. The victim is one of the yellow-haired people, and this leads to the rather obvious conclusion that the scene is directly linked with the one adjacent, where the same folk are manifestly suffering defeat in battle."

About the two parts depicting combat we read (*Ibid.*, p. 398, 402): "However this may be, the fair-haired folk are certainly suffering reverses in battle. One is being grasped by the hair and his face is fittingly distorted by unpleasant emotion. Another has his arms



Reconstruction of sacrifice shown in Plate XXXI.
(From Morris, Charlot, and Morris 1931.)



Fragment showing one of the captives.
(From Morris, Charlot, and Morris 1931.)

bound rudely behind his back. A third is being dragged backward over the prow into a canoe." "The conquering tribe, on the other hand, is represented in two different positions—some in canoes and others advancing to the attack through water close to shore."

The authors conclude their discussion of the Caucasian-like race as follows (*Ibid.*, p.402): "It has been stated that a marine combat between black warriors and a fair-skinned, yellow-haired people was taking place. The latter type is altogether significant. Quite obviously the painter is stressing an acute dissimilarity between his own people and those of another sort. The long, flowing, yellow hair, interwoven with green beads, so painstakingly delineated in the scene as well as in that of the human sacrifice, is undoubtedly meant to emphasize a difference of tribe, or even of race. I suspect that this device was stressed by the artist because the nudity of the figures precluded the use of details of dress as a distinguishing feature. There is but one exception to this absence of vesture; it is to be found in the unique yellow-brimmed hat, apparently made of woven straw, which crowns a head of yellow hair. Just what this unusual disparity of type may mean is purely a matter of conjecture, but it can not help but bring to mind legends rife throughout the American continent concerning the fair skin and golden hair of a mythical race. If the picture is a historical record, speculation would become even more interesting."

Victims as possible migrants

We know that the light and bearded Viracochas and their Inca successors added artificial ear-extension to the natural human garb. We need only look at the Chitzen Itza murals discussed above (Pl. XXIX), to note that the captors as well as captives were most decidedly "long-ears". This is a clue of some importance. In Peru, the pecular custom of ear-stretching was attributed to Viracocha, and was peculiar to his subjects, until later adopted as the privilege of the Inca of royal blood and his ten ayllus. Since both captors and captives in the ancient Chitzen Itza mural paintings are "long-ears", it would seem that there the custom was generally spread, and that both the fair and the dark race had been under the same cultural influence. In other words, only if the different sections of the murals are descriptive of different historical phases in the life cycle of the fair men is their arrival by sea at all likely to illustrate their *first* appearance in the locality. If all scenes are part of one single event, however, it would seem as if we were here dealing with a civil war between racially distinct members of the same general culture.

Both alternatives seem to deserve attention. To perceive the possibility of a "civil war" among people including a tribe with fair elements, we need merely recall with Brinton (1882, p. 161) the trouble at Chitzen Itza between Kukulcan's own "brothers":

"To bring Kukulcan into closer relations with other American hero-gods we must turn to the locality where he was especially worshiped, to the traditions of the ancient and opulent city of Chichen Itza, whose ruins still rank among the most imposing in the peninsula. The fragments of its chronicles, as preserved to us in the Books of Chilan Balam and by Bishop Landa, tell us that its site was first settled by four bands who came from the four cardinal points and were ruled over by four brothers. These brothers chose no wives, but lived chastely and ruled rightously, until at a certain time one died or departed, and two began to act unjustly and were put to death. The one remaining was Kukulcan. He appeased the strife which his brothers' acts had aroused, directed the minds of the people to the arts of peace, and caused to be built various important structures. After he had completed his work in Chichen Itza, he founded and named the great city of Mayapan, destined to be the capital of the confederacy of the Mayas. In it was built a temple in his honor, and named for him, as there was one in Chichen Itza. These were unlike others in Yucatan, having circular walls and four doors, directed, presumably, toward the four cardinal points. In gratifying confirmation of the legend, travelers do actually find in Mayapan and Chichen Itza, and nowhere else in Yucatan, the ruins of two circular temples with doors opening toward the cardinal points."

If we look at the yellow hair of the captive in Plate XXXII, there is little to indicate that the captor is pulling at "personified light rays", nor are the coiffure and whiskers of the maltreated prisoner on the fragment reproduced on page 289 a result of solar symbolism. (See another almost identical whiskered prisoner in the rear of the procession in Plate XXIX.) The bearded roof-supporting god-men carved on the pilasters outside this temple, and the golden-haired prisoners painted in the multicoloured murals within its sacred enclosures, disprove the irresponsible suggestions that the conceptions of such Caucasian-like men were only encouraged by the advent of the Spaniards; and they confirm the importance of such seemingly un-American features having occurred to the mind of the early sculptors and painters of the temple.

It may seem at first bewildering that supporters of a religion whose culture-heroes are Kukulcan and his light and bearded followers should depict the golden-haired men of their sacred history so humbled as to be on their way to the altar of human sacrifice, yet we need go no further than into our own churches to find that their decorative and symbolic art is focussed upon the crucifixion and death of the founder of this Church. It would be fully in keeping with human nature if religious heroes were first sacrificed, executed, or driven away, and later honoured with worship. Quetzalcoatl, Zume, and Viracocha, were all in trouble with the ancestors of the present natives, and yet were worshipped by them all after their departure. White and bearded men, upon their local extermination, became the culture heroes of Peru, yet a group of them massacred to the last man while still on Titicaca Island. One of the sacred white Tonapas was murdered by the ancestors of the Andean tribes which later reverenged the name Tonapa as being that of the highest mangod and creator. Even in the lowlands of northern Peru, where the last Tonapa or the last Viracocha descended to the coast before the final departure, we find artistic reproductions of dark-painted (brown) victors with white prisoners remarkably suggestive of those rendered in the frescoes at Chitzen Itza. (Compare Plate XXIX and Plate LXXXI **4**.)

Worship, persecution, and worship are a natural sequence in aboriginal America as elsewhere. Racial friction and jealousy would overshadow the former feeling of respect, as aboriginal tribes rose in prosperity and cultural standing around an immigrant hierarchy. As the years or centuries passed, the enlightened pupils would soon lose faith in the divinity of their alien masters, and uproar and unrest would urge the latter to withdraw, seeking safety and renewed veneration and power among less informed and more credulous subjects. Once departed, their teachings and benefits, and the blunders of their successors, would gradually restore their former position as the divine and benevolent culture-bearers of the past, their departure would be deeply regretted by the people and their church, and would form the basic element in their religion and historic memories.

A Caucasian-like people depicted throughout prehistoric Mexico

Leaving Yucatan, we encounter further portraits of bearded models whether we take the road through the Tabasco jungle and Vera Cruz northwest to the Mexican highlands, or the Central American road through the plateaux of Guatemala en route to Salvador and the south.

In the Tabasco jungle, where Votan was remembered to have passed from the east with his Tzequil followers, we find that prehistoric artists left behind such portraits as that shown on Plate XVII. (For detail see Plate XXII **3**.) This full-bearded figure in low relief was discovered on a large pre-Columbian stela excavated by the National Geographic Society-Smithsonian Institution Archaeological Expedition to Southern Mexico of 1939-40. Stirling (1940, p. 327), in a report on the discovery, describes the profile as belonging to a "remarkably handsome individual with an aristocratic aquiline nose and a curious long, flowing beard." The figure shows a realism and a masterly design and execution which speaks for itself.

Further west, in the Mexican Gulf at Vera Cruz, where Quetzalcoatl was first remembered as arriving in a strange winged ship, and last remembered as departing on a supernatural raft of serpents, we find interesting support for the historical tradition in the portrait of the aristocratic and beautiful bearded individual reproduced, by the courtesy of the American Museum of Natural History, in Plate XX **2**. This ancient Totonac portrait, carved on the back of a slate mirror from Vera Cruz, is an outstanding piece of aboriginal art, and the taste and composition shown by the artist, as well as the aristocratic and almost intellectual profile of the bearded model, evince that we are once again confronted with vestiges of something more than the average American Indian as known to us in historic time.

The clay head found in Tres Zapotes, Vera Cruz, by the National Geographic Society-Smithsonian Institution expedition, and reproduced with their permission in Plate XX **1** of present volume, has been described as "one of the best examples of ceramic art yet found in the New World". (Aldana, s.a.) When compared to the profile carved on the Vera Cruz slate mirror, its anthropologic implications are enhanced. Such a vividly presented race type is not product of the artists' fancy.

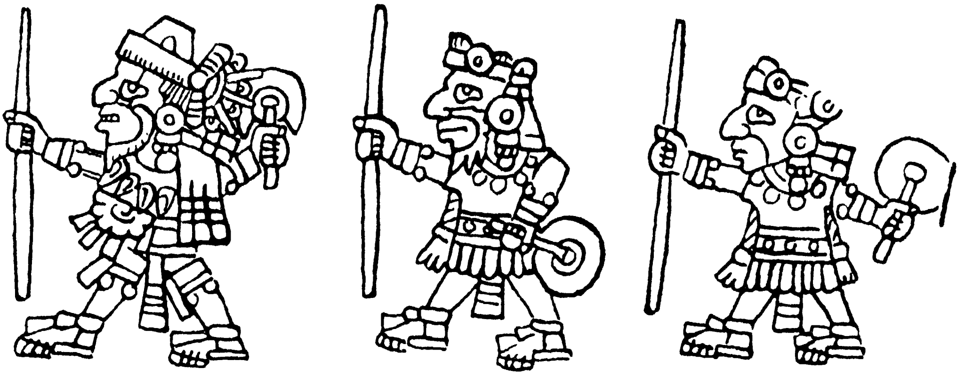
From Vera Cruz we ascend to the Mexico Valley. Again we find the legend of historic time expressed in the art of prehistoric stone sculptors. The Vischer Collection of the Basle Museum includes an early sculpture of a seated deity from the Mexico Valley (see Plate XXII **1**), and Dietschy (1941, p. 86) identifies the statue as an image of Quetzalcoatl.

We are now approaching the northern limit of this prehistoric art representation and its concurring myths, and this limit also marks the termination in this direction of the true American high-cultures, as defined by Krickeberg (1934, p. 314). (See map p. 294.)

Bearded portraits from Guerrero to Salvador and Coclé

Following the trend of the same culture-myth from Yucatan southwards through the Isthmus, we remember how a corresponding personality appeared in the vicinity of Coban and Chama, but later left in anger to search a nobler people than his unappreciative subjects in Guatemala. The oral tradition does not specify that the wanderer was bearded, but local archaeology supplies information on this point. Dieseldorff (1894, p. 374) describes a strongly bearded priest on a Chama vase found exactly where the culture hero (Xbalanque) was remembered to have entered the region, and Seler (1895, p. 307) tries to identify the figure, with its beard, strongly beaked nose, long stick and fan, with the corresponding Mexican drawings of the wandering Quetzalcoatl.

Presenting the drawings reproduced on next page, Seler (*Ibid.*, p. 311) says: "...to the illustrations taken from Codex Mendoza, I add a further example... which is borrowed from the Mixtec Codice Colombino (Codex Dorenberg), and which deals with a being of more mythical nature. Persons engaged in wandering are undoubtedly depicted here also, having a staff in the right hand, perhaps signifying a lance and perhaps a walking stick, with a fan in the other. But the first of the persons is here the most famous of the Mexican gods, Quetzalcouatl, god of the winds and the hero of the myths of Tollan. It does not seem altogether improbable to me that this group represents the *wanderers* of the Toltecs under the leadership of their god Quetzalcouatl."



Mexican wanderers. (From Seler 1895.)

The fact that prehistoric artists working on Chama pottery have striven to represent the meeting of two distinct physical types of their aboriginal days, has also been pointed out and stressed by Vaillant (1931, p. 248). In an article entitled "A Bearded Mystery", the author takes up the problem presented by the seemingly non-American bearded physiognomies represented in native American art, from the vicinity of Mexico City to Chiapas and Guatemala. Vaillant centres his attention around the remarkable bearded clay head of Rio Balsas, reproduced by the courtesy of American Museum of Natural History in Plate XVIII. This piece of outstanding realistic portraiture is no more symbolic or imaginative than are the Caucasian-like profiles and masks from Tabasco and Vera Cruz. Discovered at Rio Balsas, on the Pacific slopes of Guerrero in southwestern Mexico, this clay head cannot but recall Capt. Cook's description of the Caucasian-like element which had found its way out to the Marquesas Islands, the nearest inhabitable island stronghold off these coasts of tropic America. Cook (1777, Vol. 1, p. 308) wrote: "They observe different modes in trimming the beard, which is, in general, long. Some part it, and tie it in two bunches under the chin; others plait it; some wear it loose; and others quite short."[1]

Having shown that the Rio Balsas clay head actually is the work of an indigenous artist of pre-Columbian times, Vaillant (1931, p. 247) adds: "We are left in the perplexing position of having the same physical traits portrayed by artists of several different tribal groups, who have evidently recognized a people different from themselves."

Drawing a parallel in Guatemala, Vaillant says (*Ibid.*, p. 248): "... from Chama in Central Guatemala comes a very remarkable Maya vase, painted in colours to show a ceremony involving seven characters. ... There is no doubt that the painter of that Maya vase was striving to reproduce two physical types, his own and another; and the foreigners are of the same group as the head from the Rio Balsas. The scene seems to resolve itself

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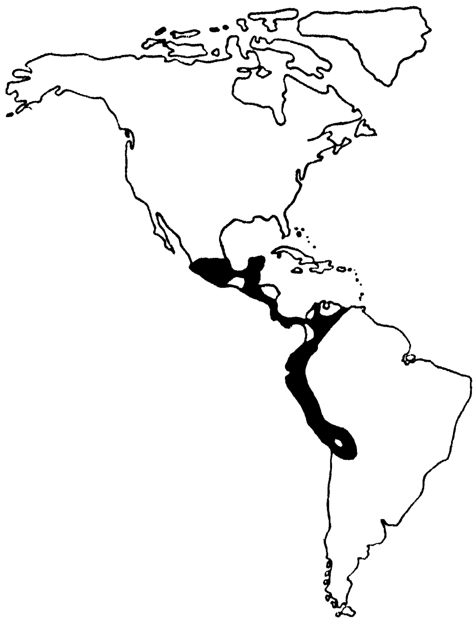
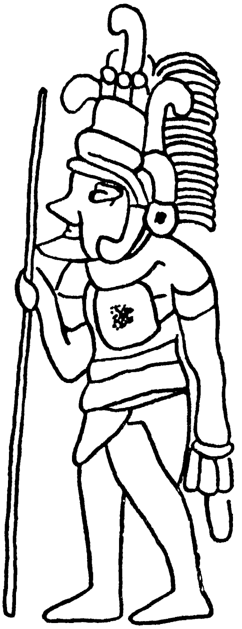
[1] Fleurian (see Linton 1923, p. 420), too, wrote from the same islands: "Those who wear their beards full length, and these are the greatest number, arrange them in different ways. The commonest is to part the beard in two tufts, shaving or plucking the chin, and letting the beard grow on either side. Many others let it all grow and separate it into locks, which they plait, ..." And Beechey (1831, p. 138) from the discovery of the Mangarevans: "...the nose in general is aquiline; ...the mustachios grow long, but the beards, which are kept from three to four inches in length, are sometimes brought to a point, at others divided into two; one man, however, was observed with a beard which hung down to the pit of the stomach."



Distribution of American high-cultures.
(After Krickeberg 1934.)



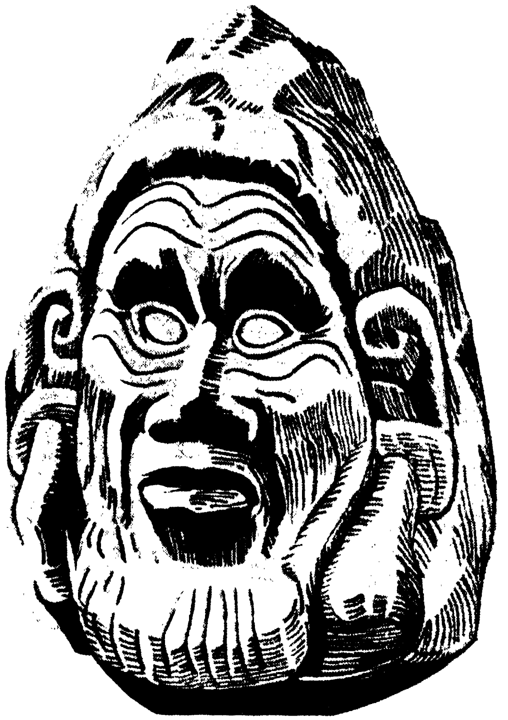
Relief figure on stela from Tres Zapotes.
(From Stirling 1943.)

into the reception by a Maya chief and his court of a stranger whose attendant kneels before him while a Maya gentleman-in-waiting makes the sign of peace after the completion of the introduction of the two rulers. Thus the vase gives strong indication that a people existed of whom the little bearded figure from the Balsas is likewise a reproduction."

Archaeology thus shows that the tradition of the bearded wanderer, as told to the early Spaniards, embodied pre-European conceptions, depicted in still earlier descriptive art right across Mexico from Guerrero to Yucatan, from the Mexico Valley and northern Vera Cruz to Chiapas, and thence into the present republic of Guatemala. This vast but coherent geographical area may be extended even further southward on the Pacific side. Lehmann (1924, p. 39) shows that bearded figures are frequently found in the pottery-ware of Salvador. They are either rare or absent in Nicaragua and Costa Rica, but seem to reappear on the Panama Isthmus, where they are mentioned by Verrill (1929, p. 81, 138). He says of a stone monument at Coclé: "One human figure is represented with one hand stroking a long chin-beard which is strikingly reminiscent of an Assyrian figure." The same author (*Ibid.*, pp. 264-266), familiar also with Tiahuanaco, claimed that certain aspects of the megalithic ruins there are "most strikingly like the similar monuments found at the ruined temple site at Coclé in Panama."

As we shall see, there are both bearded portraits and megalithic cult sites on the Pacific slopes which geographically unite Coclé with distant Tiahuanaco. Throughout the extent of present Peru, from the north coast to the southern inland, pre-Inca artists have in one art-style or the other sculptures or moulded faces of a bearded model who seems to have occupied their minds especially along the itinerary assigned by the later Inca to the migrating Viracochas.

Pre-Inca statues of bearded men at Lake Titicaca



Stone head from Guatemala.
(From Krickeberg 1950.)

We recall from the legends of the Viracochas that their first activity at Tiahuanaco was to carve human busts of stone, formed as models for the respective tribes and peoples which their divine leader was to create among the preexisting mountain tribes. When they were finished, he had them moved to other places, whereupon he 'created a community' also in Tiahuanaco by carving similar models in stone. It is interesting therefore that the Tiahuanaco artists actually left in their own megalithic site and in its vicinity a number of stone busts, many of which have been preserved to our day, among them a few which depict a bearded race.

The nearest shore to Titicaca Island is that of the great peninsula of Copacabana, projecting almost the whole width of the lake between the island and the southern plains where Tiahuanaco is located. This peninsula would be the most natural landing-place for the Titicaca islanders on a push to the mainland. Moreover, ruins in the Tiahuanaco style, and a considerable number of stone busts of Tiahuanaco workmanship, have been identified on the peninsula. In the Mocachi zone, on the south side of the peninsula facing Tiahuanaco, Casanova (1942, p. 338) describes an area with worked stones from prehistoric constructions, fragments of great stone statues, and scattered stone tools, covering an area much greater than that actually inhabited by the natives. In its centre are preserved a number of great stone blocks up to 8 feet high, marking the outlines of a 'Kalasasaya', or House of the Sun, smaller than—but very similar to—that principal building of Tiahuanaco.

As clearly shown by Casanova, it is obvious that this megalithic cult site corresponds to the culture of Tiahuanaco, and probably even to its earliest period. Scattered about on the ground, and partly buried, are fragments of carvings of men and animals, all spread in utmost disorder and evincing that religious persecution rather than time was the principal agent of destruction. Among a pile of rough stones and fragments of statues a few yards from the temple, a monolith was discovered which was almost totally buried but for its anthropomorphic face. The carving was 0.80 metres high, and the head, occupying almost half its height, had a scarcely perceptible line carved around its upper part to indicate the existence of a fillet or head-wear. Casanova's description (*Ibid.*, p. 341) is of special interest: "The countenance is large with eyes and nose scarcely marked, a big mouth with thick lips and a strong and prominent little beard [*barbilla fuerte y prominente*] which rests on the breast. The body is rounded and presents at the level of the waist a relief which seems to represent a belt or girdle, and from there the statue terminates abruptly, without signs of lower extremities."

The arms of the statue are carved in relief in such a way that the elbows are bent and the hands placed on the breast, Casanova concludes (*Ibid.*): "This monolith presents characteristics which distinguish the stylistic group dominant in Tiahuanaco... What is outstanding about this idol is its realistic aspects, the curves replacing the angles, the special attention which is lent to the head and hands, the amplification of certain traits such as the cheek-bones and the beard which are very prominent, ..."

Among the best preserved of the many mutilated and shattered stone statues of the Mocachi site is another monolith which Casanova (*Ibid.*, p. 342) describes as even more interesting. This ancient sculpture was still so profoundly respected by the present inhabitants of pure and indigenous race that they showed both fear and hostility when it was approached by outside visitors. Like the figure just described, it represents a Viracocha-like individual with a beard. (See ill. page 298.)

It was carved from one quadrangular block of reddish sand-stone, six feet eight inches high. All four sides were carved with figures in relief, one bearded individual on the front and another on the back, surrounded by snakes. Casanova (*Ibid.*, p. 345) writes:

"The front surface shows the most important representation: a man with a large head with a head-dress resembling a turban which continues over all the upper part of the monolith. The face of the idol has rounded eyes, large nose, and huge mouth with thick lips. The small but prominent beard rests on the breast.

"The body follows the rigid forms designated in conformation with the stone. The right arm rests on the chest, and the hand, with five fingers, is placed over the heart. The left hand is placed over the abdomen touching with the extended fingers a depression which it has on the right side. The legs are not represented, perhaps because a long tunic covers them. And on this vestment is encountered the most interesting figure seen on the lower part of the monolith. Over a sort of a neck or haft terminating in two lateral spirals, a head rises resembling the one described, but much rounder in form and displaying the peculiarity of dissolving into tongues."

Casanova (*Ibid.*, p. 347) points to the striking resemblance even in minor details between this sculpture from the Copacabana peninsula and a monolith excavated by Bennett from the ruins of Tiahuanaco, a resemblance which may well be appreciated by comparing the illustrations reproduced on page 298 and page 299. The Tiahuanaco origin of the Copacabana stone statue has been generally accepted as manifest. (Steward 1946, p. 135.) This naturally suggests that the Copacabana figures belong to the group of stone statues described in Inca traditions as once raised by the Viracochas of Tiahuanaco in this vicinity. At any rate the details on these particular statues concur in a remarkable way with the legendary aspects of Viracocha and his kin, as described orally to the Spaniards by the early Incas: the fillet-like headwear, the beard, the long vestment reaching to the feet, the girdle, all traits assigned to them by the early Peruvians. And the detached and rounded head ornamenting the lower part of the vestment of the major figure no doubt represents his ancestor, the sun, with its flickering flames and its spiral symbols.

Here we have the best possible criterion of the distinction between the celestial sun and his earthly representative, the Viracocha. The latter has all the aspect and garb of a human priest, ceremonially ornamented with the symbol of the divinity he serves and represents. The long-robed bearded man wears the symbol of this celestial divinity in the ornamental form of a flickering ball equipped with two symbolic spirals rather than body and limbs, and humanized only to the extent that it has been given a human visage to show its relationship to man, and the outlines of a moustache to leave no doubt as to which breed of man it is related.

The horned serpent carved on the side of the bearded statue reappears in an almost identical form on the corresponding bearded monolith of Tiahuanaco (see ill. page 299), and this gives us another clue of no small importance. The bearded Quetzalcoatl and Kukulcan of Mexico and Yucatan are also intimately connected with snake symbols both in their names and in their symbolic representations. The *horned* serpent is in Mexico the direct symbol of the day sky, whereas the *plumed* serpent is the symbol of the night sky.[1] As shown by Dietschy (1941, p. 88), this same strange symbol of the heavens was shared by the early high cultures both of Mexico and Yucatan. From the latter area he writes: "The horned serpent as symbol for the heavens occurs already in the 'Old Empire' of the Mayas and among the early Tzapotecs, today even among the Pueblo Indians to the north. Its head appears on the head-band of the sun-god on the frescoes and reliefs of the Naua-buildings of Chichen Itza and in the paintings of Palace I of Mitla. In Codex Borgia it is also head-ornament for *Tonatiuh*, as well as for *Tonacatecutli*, *Quetzalcouatl*, *Cinteotl* and *Xochipilli*, . . ."

We shall shortly see that the horned serpent was the specific ideogram for heaven and appeared as head-ornament on the sun-god and high royalty also among some of the principal pre-Inca culture-spreaders in Peru. When so highly specialized a symbol for the heavens is shared by the early artists who depicted the bearded men of Mexico and Yucatan, and reappear on a bearded statue at Mocachi and another at Tiahuanaco, we have ample reason to suspect the possibility of a source connection between the ideograms of the roving artists. And since the horned serpent ornamented supreme Mexican gods and culture-heroes like *Tonaca*-tecutli (Chief *Tonaca*) and Quetzalcoatl, its Peruvian counterpart may well ornament the corresponding local chief *Tonapa*, alias Viracocha.

At the most ancient level some 10-12 feet below the surface, Casanova (1942 p. 354) found in his excavation at the Mocachi site a single anthropomorphic representation, a fragment of a human head in reddish coloured clay. He says (*Ibid.*, p. 363; italics by T. H.) "This piece must form part of a vase; in spite of its reduced dimensions *one may appreciate the small beard*, the mouth, part of the eyes, and the nose with its nostrils on the upper part of which there are four small holes of uncertain significance, perhaps serving to fasten an ornament." As will be seen later, Bennett (1950) also mentions that some of the Mocachi ceramic heads have representations of scraggy beards on the chin.

Pre-Inca sites with stone statues in human form have been found in several other localities around Lake Titicaca, as at Pukara (Valcárcel 1935 b), Hilavi (Arriaga 1910, p. 53), Huari (Wegner 1934, p. 164), Arapa, Taraca, Conima, etc. (Kidder 1943), and many more figures were badly mutilated if not totally destroyed by religious fanatics of post-

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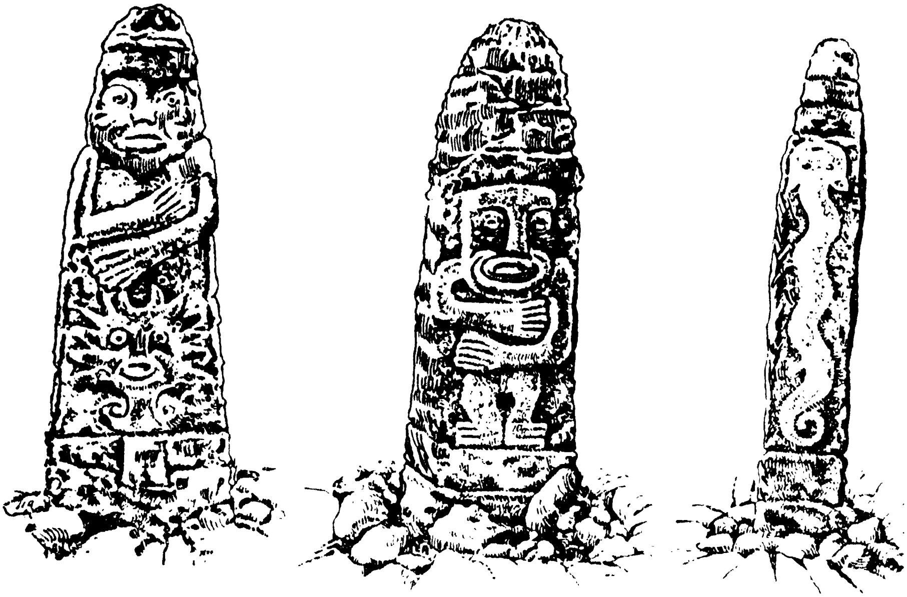
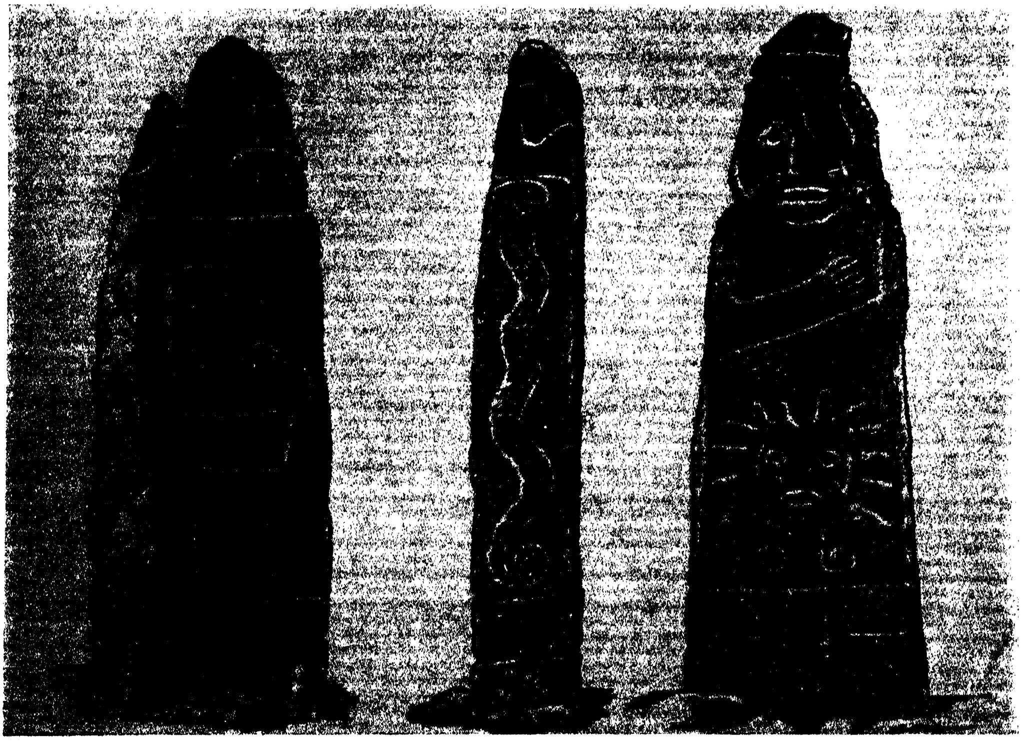
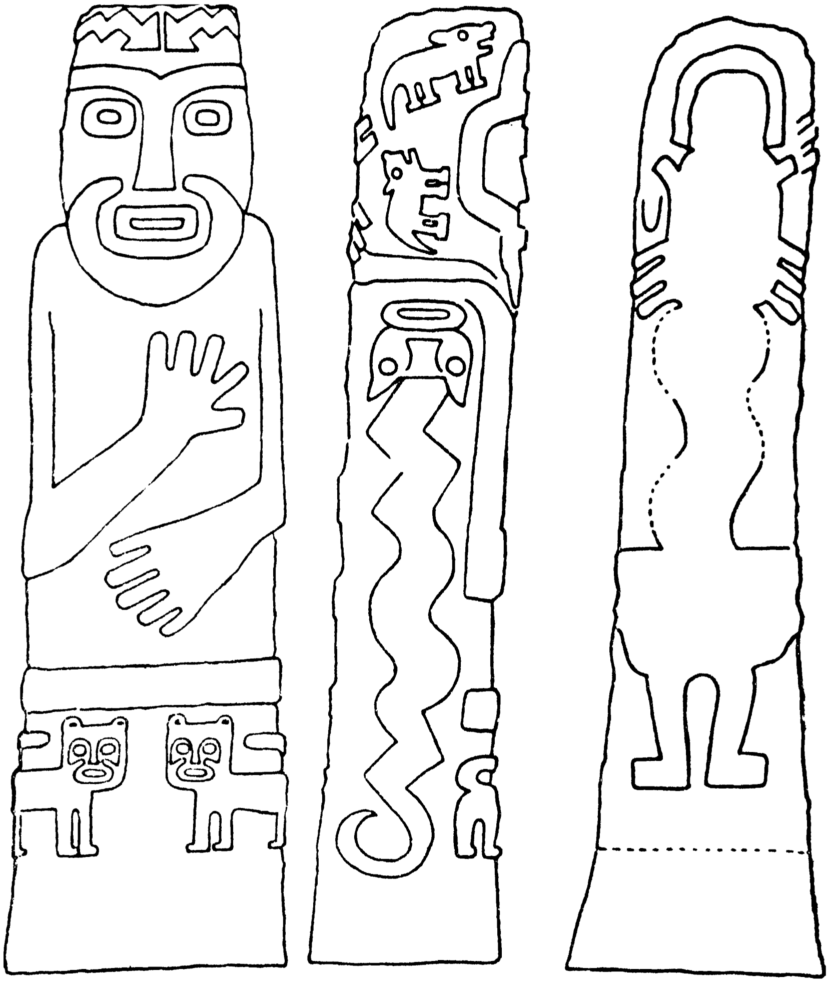
[1] The plumed serpent, symbol of the *night sky*, is termed Quetzalcoatl, a proof in itself that Quetzalcoatl cannot be a personification of a "light-ray" or the sun.



Front, back, and side view of monolith from Mocachi. (From Casanova 1942.)



Same monolith redrawn from photograph by Casanova. (From Steward 1946.)



"Front, Side, and Back View of Smaller Bearded Statue of Pit VII [Tiahuanaco]. The front view shows the curled up beard and the lightning rays on the forehead, both of which are connected by a raised band on the side." Back of statue is badly defaced by erosion. (From Bennett 1934.)

Columbian times. There is an apparent resemblance between the statues of Hilavi and Mocachi, and in Huari and Taraco there are two stone statues which, down to the detail of the beard, are so remarkably like the bearded monolith from Mocachi already described, and its bearded prototype at the actual Tiahuanaco site, that all four obviously must have derived from the same stylistic inspiration, if not from the hands of the same artist. Where the bearded Mocachi statue has the head of the sun with flickering flames carved in low relief at the base of the mantle, the one at Huari has, similarly placed in low relief, a cross-shaped and perforated ideogram. Local tradition tells that while the other ancient monuments at the Huari site were destroyed, this one was saved from destruction by the early friars because they observed the 'cross' on its front and back. (Wegner *loc. cit.*)

The bearded stone statue discovered by Kidder (1943, p. 19) on Arapa Island in Lake

Arapa, at the north end of Titicaca, is carved in a different style. It was found in a farmyard where it had been "as long as anyone can recall", and was badly mutilated, but the flowing beard is clearly visible. Apart from the defaced traces of trophy heads carried by the figure, the vestiges of its large extended ears with a circular nugget in the lobe are still visible. (See Plate XXIII **1**.)

Only a minority of the many stone statues around Lake Titicaca are carved with long robe and beard. This lends weight to the theory that they were probably never carved as idols or images of any supreme or invisible god, nor all in the image of Tici Viracocha himself, but as ancestral figures representing tribal progenitors. If this assumption is correct, only a minority of the tribes brought forth around the lake by the Tiahuanaco creator and his disciples, and so only a minority of the stone statues erected in the vicinity by them, were of Viracocha's own stock and required a stone progenitor in his image.

A bearded race type among Tiahuanaco stone statues

At the early site of Tiahuanaco or Chucara a considerable number of anthropomorphic monoliths were carved by the aboriginal occupants. Some are still left *in situ*, but many were destroyed or removed to other areas in post-Columbian times. Among the more recent discoveries was the statue excavated by Bennett in 1932 within the walls of a small semi-subterranean Tiahuanaco enclosure, and representing a bearded man. (See Frontispiece.) The enclosure and its statue were found just to the *east* of the great monolithic stairway leading, also from the east, into Kalasasaya, the main Tiahuanaco temple and House of the Sun. This location may be a coincidence, and yet in view of the religion and the lay-out of the various Tiahuanaco buildings, one cannot help noticing that the small enclosure stands where a solar representative would be most likely to make his ceremonial appearance on entering the cult-site of Tiahuanaco or Chucara.

The bearded figure referred to by Bennett (1934, p. 441) as the "Smaller Bearded Statue of Pit VII" was excavated beside a larger 25 feet monolith also carved in human form. The smaller bearded statue, about eight feet tall, was of different workmanship from its giant neighbour, and cruder. Bennett was emphatic, like Casanova, about the resemblance between the bearded Mocachi and Tiahuanaco carvings. He describes the Mocachi statue (*Ibid.*, p. 482), as "almost identical to the small bearded statue of Pit VII, with beard, spread hands, and serpent figure on the sides." Like its counterpart at Mocachi, the Tiahuanaco monolith was carved from a selected reddish sandstone, secured and transported from a distance.

The head of the long-robed and girdled figure on the statue was described by Bennett (*Ibid.*, p. 441) as follows: "Two lightning rays meet in triangular points on the forehead of the statue and continue down the sides of the head, joining the bar of the T-shaped nose, and running into the beard which surrounds the mouth. This beard, in high relief, curls up on each side of the mouth and forms a point on the chin."

While the corresponding bearded statue at Mocachi wears a long robe with a solar emblem decorating its lower half, the Tiahuanaco figure is correspondingly ornamented in the same place with two *pumas*, the familiar Tiahuanaco symbol connected with Viracocha and divinity. The stylistic whiskers of the pumas are represented by the same lines as on the face of the bearded man, but for his pointed chin beard (which is even more marked on the statue than on the drawing. Casanova 1942, Pl. IV.)

Bennett points out that the enclosure in which the bearded statue was found probably belonged to the Decadent Tiahuanaco period, to judge from the style of ceramic fragments found there. This dating is admittedly very uncertain if transferred to the monoliths found within the same enclosure, as there is nothing to indicate a stylistic or chronological unity between the two items. In fact, as Bennett shows, the larger of the two statues wears an incised design clearly of Classic Tiahuanaco style, and accordingly antedates the surrounding ceramics and possibly even the enclosure where it was found. The smaller and cruder statue of the bearded man is hardly contemporaneous with its Classic Tiahuanaco neighbour, and it therefore seems likely that it is either a creation of the decadent period shortly before the Inca conquest of this region, or else, like much of the remaining stonework of the Tiahuanaco site, has survived *in situ* or been re-used since the early Tiahuanaco I period. In view of its striking similarity to the Mocachi, Huari, and Taraco monoliths, and the horned serpent motive ornamenting its sides, there seems to be much in favour of an early rather than a late and decadent Tiahuanaco period for this statue.

The lightning flashes on the head of the figure are undoubtedly merely a symbol of light and heavenly descent.[1] Posnansky (1913) has shown the step-sign in Tiahuanaco art to symbolize heaven in relation to earth. Yet the two lightning flashes on the forehead form an independent design only when the statue is seen from in front, whence the human figure is presented in high relief. There is apparently more significance in the lightning flashes when we look at the figure from the side. The sides of the same monument are entirely without anthropomorphic details, but are devoted to plainly symbolic designs, the purpose of which is obviously to replace writing in an effort to convey further information about the person represented in relief on the front. Together with animal symbols on each side of the column we find a raised band, formed directly by the lightning flashes which run down from the forehead along the side of the statue to send one branch into the eyebrows and another down into the beard (see figure). To me, this is just about the only way an artist working in plastic art could convey that his model had light-coloured hair, eyebrows, and beard. He could, of course, select a reddish stone material for the carving, which was also done, but this would give the whole statue the same ruddy colour.

We shall see later that a number of loose stone heads have been found among the cut stones of the ruined constructions at Tiahuanaco. They have no connection with the statues, as they seem to have been carved separately, more or less for ornamental purposes, and were probably attached to the cut-stone masonry of the walls. Posnansky (1914, p. 87) says of these heads: "Many of them show a fillet-like headwear resembling a turban, and a strongly projecting under-jaw, stretched out in the length, which it is likely may indicate a bearded chin."

Rivero and Tschudi (1851, p. 295), followed by Inwards (1884, p. 25), also speak of a 3 ½ ft. stone-head with a strange cylindrical cap and stylished beard, found on the road from Tiahuanaco to La Paz.

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[1] Since the snake-symbol is the direct ideogram of light and sun-rays among high-cultures both in Mexico and Peru, the triangular point of the rays in question may possibly represent serpents heads, since these are occasionally stylised in a very similar manner in early Peruvian art.

We cannot, of course, generalize from the Tiahuanaco tradition and say that all stone statues on the Titicaca plateau were raised by a hierarchy as ancestor figures for tribes in that locality. We have already seen in Tiahuanaco that stone-carvings, including the anthropomorphic statues, belong at least to two different periods. Yet, again, the same or a similar magic trick might have been repeated more than once.

We know, however, of Peruvian statues intended for other purposes, and carved subsequent to Tiahuanaco times. Thus the post-Tiahuanaco Indians of Cacha, south of Cuzco and on the main Inca road from Titicaca, raised a stone statue solely in veneration of the particular Tici Viracocha who passed through their land on his final departure from Tiahuanaco to the Pacific coast. Similar images of the departing Tiahuanaco ruler were also dedicated to his worship at Tambo de Urcos and Cuzco, important stopping-places on his final route, but whereas the images in the latter places were of gold and were therefore melted at once and valued solely in pesos by the arriving Spaniards, the one at Cacha was of stone and survived long enough to leave us a description of the venerated person it represented. From Garcilasso de la Vega (1609 b, p. 70) we learn that this statue of Viracocha was discovered, raised on a great pedestal, inside an Inca temple built of cut stone: "The image represented a man of good stature, with a long beard measuring more than a *palmo*,[1] in a wide loose robe like a cassock, reaching to the feet."

The early Spaniards were astonished to find among the 'barbarous' and beardless Indians an image with such a striking resemblance to their own Old World saints and Apostles. The apparently Caucasoid aspect of the person depicted made a great impression upon the newcomers, and even had religious consequences affecting to some extent the otherwise hostile attitude of the Spanish missionaries towards the local Viracocha beliefs. According to Cieza (1553-60, Part I, Chap. 97) some of the Spaniards came to the conclusion that the Viracocha statue represented not a heathen idol, but one of the Apostles who must have come to Peru before the days of Columbus. Indeed, Garcilasso (1609 b, p. 71) says:

"The Spaniards, after seeing this temple and the statue with the form that has been described, wanted to make out that St. Bartholomew might have travelled as far as Peru to preach to the Gentiles, and that the Indians had made this statue in memory of the event."

The Spanish-Indian mestizos of Cuzco even went as far as to form a brotherhood adopting St. Bartholomew, as embodied in this ancient statue, as their guardian, and religious friction arose: "The temple was then destroyed, first one part being thrown down, then another until the whole was in ruins. The statue of stone continued to exist for some years, though disfigured by the stones that had been hurled against it." Karsten (1938, p. 200) points out that the bearded statue of Viracocha was carried away by the Indians and hidden for some time near Cuzco, but it was rediscovered by a pious Spanish iconoclast who caused it to be destroyed.

There is little reason to suppose that the contemporary images of Viracocha in pure gold on the hill at Tambo de Urcos and at Cuzco differed much in aspect from that carved in stone at Cacha, since all depicted the same pan-Peruvian culture-hero as worshipped through centuries by the same Andean people. Art treasures of gold all went quickly into the melting-pot of the early Conquistadores, and few would stop to marvel at any outward resemblance to saints. But *Relacion Anónyma* (1615, p. 148), as quoted by Brinton (1882), speaks of a now destroyed marble statue of Illa Ticci Viracocha in the great Cuzco temple later chosen for the Cathedral. This statue is described as being, "both as to the hair, complexion, features, rainment and sandals, just as painters represent the Apostle, Saint Bartholomew." And we do not have to proceed very much further north along Viracocha's Andean road of departure before we find more vestiges of him and his followers in some of the most realistic portraiture ever left for posterity by prehistoric artists. These are the anthropomorphic pottery jars of northwestern Peru.

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[1] One palmo is about 9 inches.

Caucasian-like race-type with flowing beards on Early Chimu effigy jars

Inca tradition maintains that Tici Viracocha followed the highland road from the Titicaca plateau to Cajamarca before he descended to the coast. At Huamachuco on this road, just before entering Cajamarca, we encounter again prehistoric clay models of a strongly bearded and Caucasian-like race-type. (Seler 1893, Pl. 26, fig. 21.) And when we descend, by the shortest passage from the Huamachuco-Cajamarca area to the Chicama Valley and the coast, we enter the heart of the area in which the bearded pottery portraits are distributed.

It has been a great drawback to our understanding of early Peruvian history that none of the many important events before the rise of the Inca dynasty and the arrival of the Spaniards were described and preserved for posterity in a written language. We are apt to forget, however, that there are still certain details which no combination of words, no author, can describe with the accuracy of representive art. In a recent paper, Kutscher (1950) stresses most emphatically the point, made already by Squier in the nineteenth century, that iconographic studies, especially of the realistic pictorial representations in the Early Chimu ceramics, provide an excellent means of reconstructing the past of the early prehistoric civilization on the Pacific coast of North Peru. He says (*Ibid.*, p. 196):

"The easiest approach, of course, is found in the effigy vessels, which quite correctly are considered to be in the first row of ancient American art. They may also be regarded as anthropological specimens which yield a great deal of information. First of all, they tell us about the physical type of these people in a most naturalistic and sincere way. A comparison shows that this early civilization was built up out of a mixture of at least three different racial types. The physical appearance of the Early Chimu is therefore better known to us than that of most other Indian tribes."

Also (*Ibid.*, p. 202): "If at some time it becomes possible to reconstruct partly the highly interesting civilization of the Early Chimu, and so to understand the basic principles of this culture, it will be thanks to those unknown and nameless artists who created these ceramics more than a thousand years ago. The monument which they have erected for themselves and for their people is not *aere perennius* but was created with the simple tools of potters, who were artists and, in some way, anthropologists at the same time."

Among the thousands of Early Chimu pottery portraits one extraordinary racial type is readily distinguishable from all the rest, concurring entirely with the Caucasian-like type under discussion. (See Plates XXVI and XXVII.) In very many cases it is decipted wearing a long and flowing beard, most realistically moulded and painted. These portraits strikingly recall the similarly deviating race type depicted in the bearded reliefs and moulded clay heads in early Mexico. (Se Plates XXIII **2-4**, XXIV, and XXV.)

Early effigy jars depicting this bearded model from the Chicama-Trujillo area of North Peru are spread through private and museum collections in most parts of the world, and vary mainly in the ornamental pattern of the cloak, headwear and ear-plugs of the person depicted. Common to all is the strange fillet or turban-like headwear, the long vestment with legs covered or omitted, ears extended by enormous plugs, a prominent well-bridged, aquiline nose, and a long and flowing white-painted or dark-striped beard. The model or models seen by the Early Chimu potters agree in every respect with the peculiarities, remembered throughout the Inca kingdom, of the Viracocha of Tiahuanaco who descended to this area.

It may be argued that perhaps some of the early Indians themselves had a strong growth of beard and a Caucasoid aspect as shown in these aboriginal Chimu portraits. But that is all I actually want to demonstrate. We are not looking for pre-Columbian Europeans in Peru. All that Polynesianists are looking for is a nearby Pacific area whence migrants resembling the *Caucasoid type* might formerly have had a ready and natural access to Polynesia. There is strong opposition from many quarters to the suggestion that America can ever have contained such a race before Columbus, and my object in the present volume is merely to meet this view with available evidence. Whether the deviating American racial type in question can possibly have developed in Meso-America from the norm of the Yellow-brown race, or whether, like the Yellow-brown stock, it represents an independent immigrant strain, has no direct bearing on the question on hand; what matters is whether or not such a Caucasian-like race type can have existed among the aborigines in coastal Peru, to the windward of Polynesia, in the pre-Inca centuries of early Polynesian migrations.

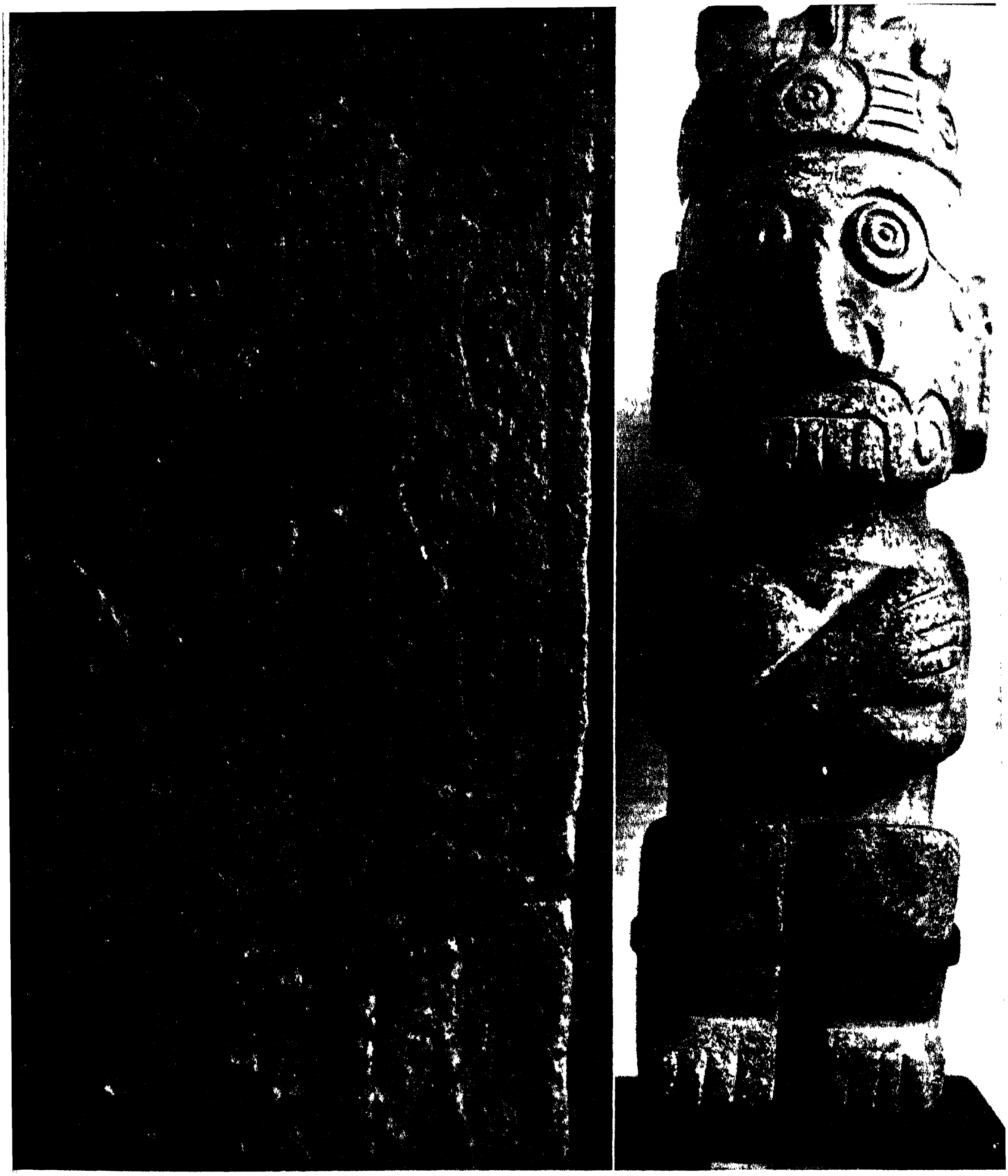
As stated, Lehmann (1924, p. 39), points out how the bearded ceramic figures of Salvador, in Central America, reappear on the coast of North Peru; and Leicht (1944, p. 289), in his work on Chimu art and culture, finds it remarkable that the beardless Indians of the Chimu area, at the peak of their early prehistoric culture, modelled and painted certain figures with such remarkably long beards. The same author points out the interesting analogy between the arrival and departure of bearded culture-heroes in Mexico and the discovery in the early capital of the Cimu nation of corresponding portraits.

It is also worthy of notice that at Lambayeque, on the Peruvian coast north of the area of the bearded effigy jars, a closely related form of bearded pottery head is found, (see Plate XXIII **5**) somewhat less realistic, and with the typical puma-teeth symbols characteristic of the anthropomorphic monoliths both in the San Augustín culture of southern Colombia and the Chavín culture of northern highland Peru. It is interesting that Lambayeque, as will be seen later, is the home of a tradition describing the arrival of coastal craft from the north.

The modelling of the bearded, cloaked and turbanned individuals continued to some extent also in the Late Chimu period. (See Plate XXV **4**.)

Cultural instability of the Chimu area

We know that the *earliest* inhabitants of Peru, at their archaic cultural stage, must have arrived by degrees as land or coastal migrants from North America, through Mexico,



1 Bearded profile in low relief, Chitzen Itza, Yucatan. (Photo: *T. S. Ferguson.*) **2** Stone statue of culture hero from Oaxaca, Mexico. (Collection *Musée de l'Homme, Paris.*)

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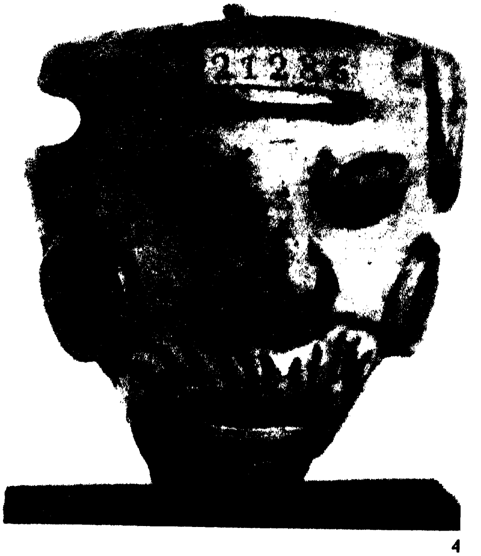

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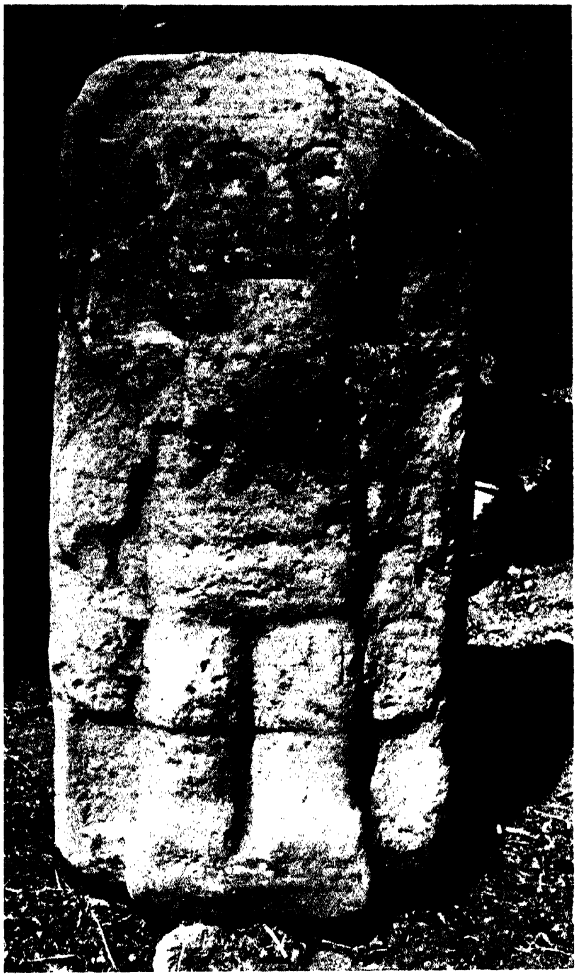
Plate XXII

1 Ancient Aztec representation of he bearded Mexican culturehero Quetzalcoatl. (From *Dietschy 1941.*) **2** Maya priest at worship, relief from Tabasco, S. Mexico. (Photo: *Amer. Mus. Nat. Hist.*) **3** Detail of the bearded racetype in plate XVII, Tabasco, Mexico. **4** Jade head from Oaxaca, Mexico. (Collection *Musée de 'Homme.*)

Plate XXIII

1 Statue of bearded man with large perforated ears (badly defaced) from Arapa Island, Titicaca basin, Peru. (Photo: *Peabody Mus., Harvard Univ.*) **2** Realistic Early Chimu pottery portrait from Huaca de la Cruz grave, North Peru (from *Bennett 1939*), and **3, 4** from archæological sites at Moche (from *Kroeber 1925*). **5** Conventionalized form from Lambayeque, also North Peru, with feline emblem and puma teeth symbolizing divinity. (Photo: *A. H. Verrill.*)



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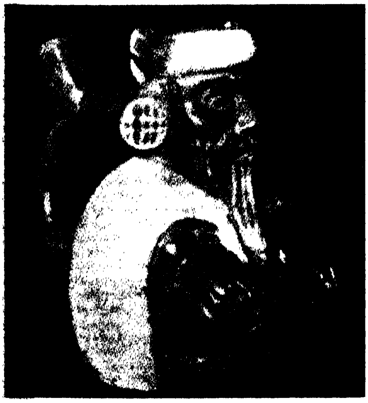

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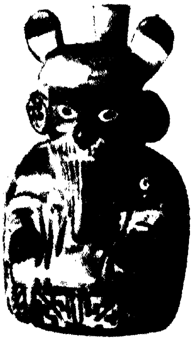

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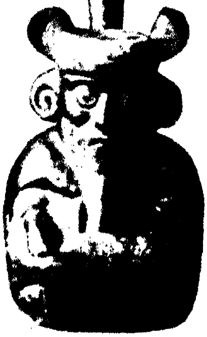

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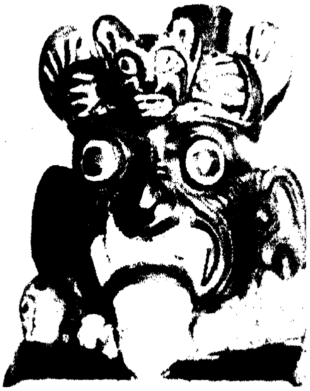

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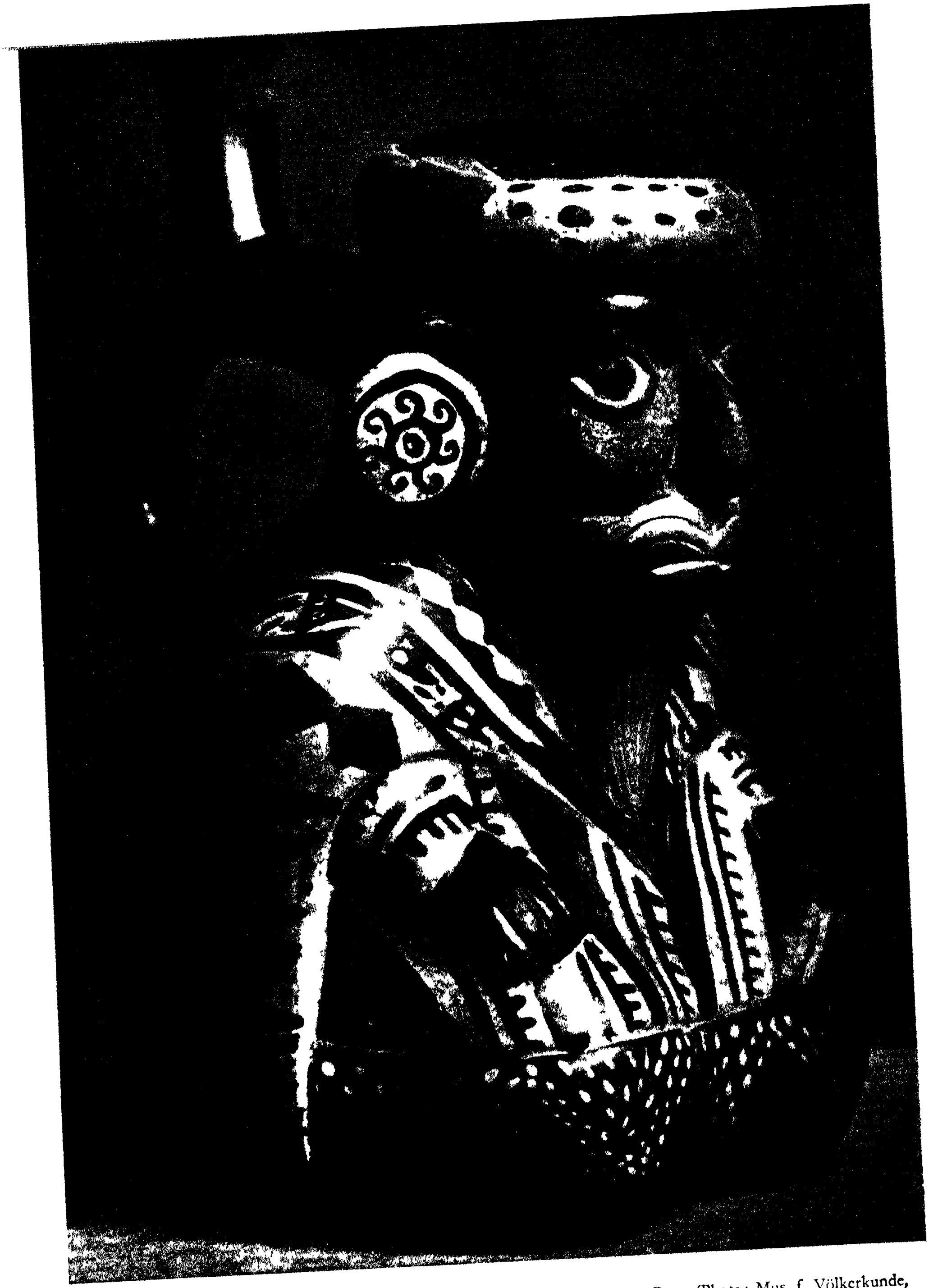
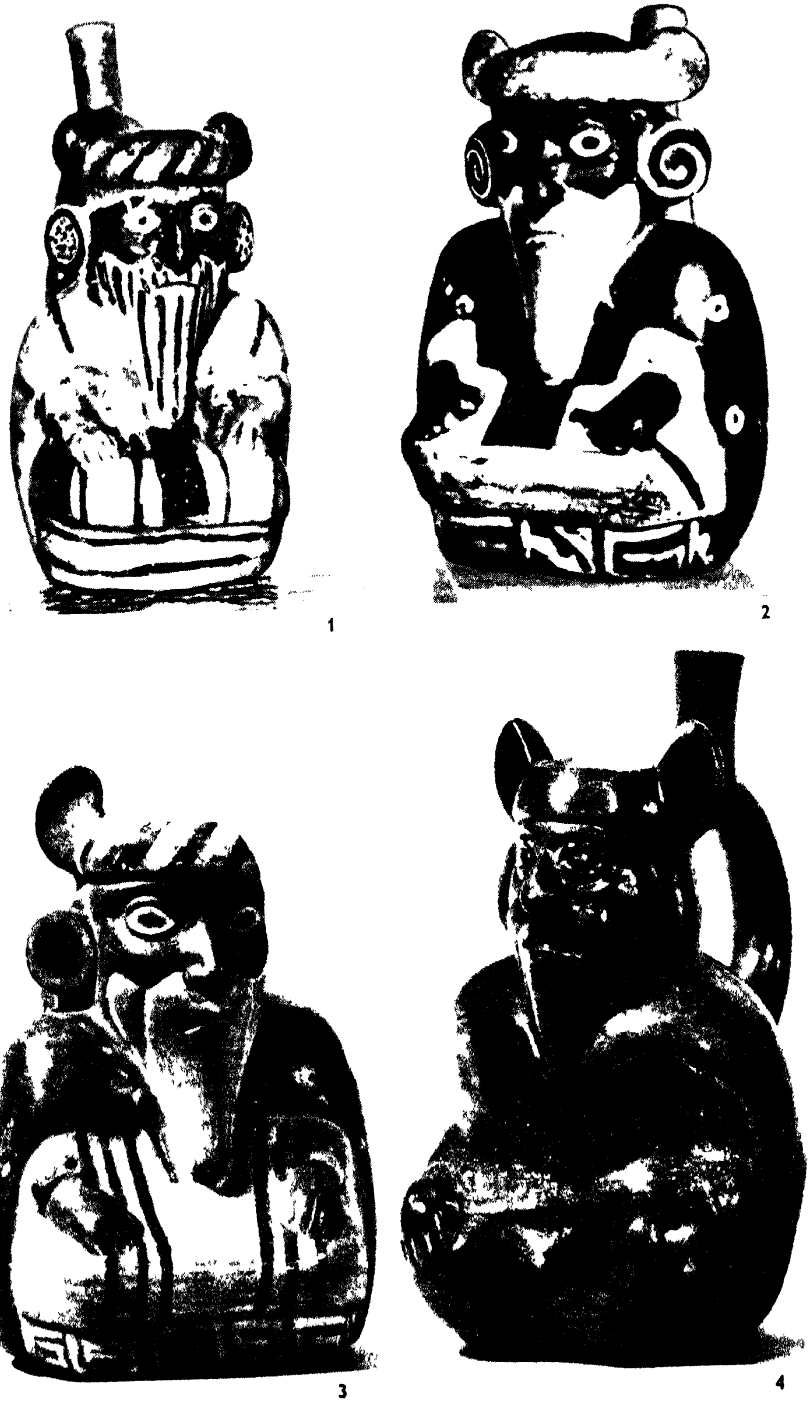
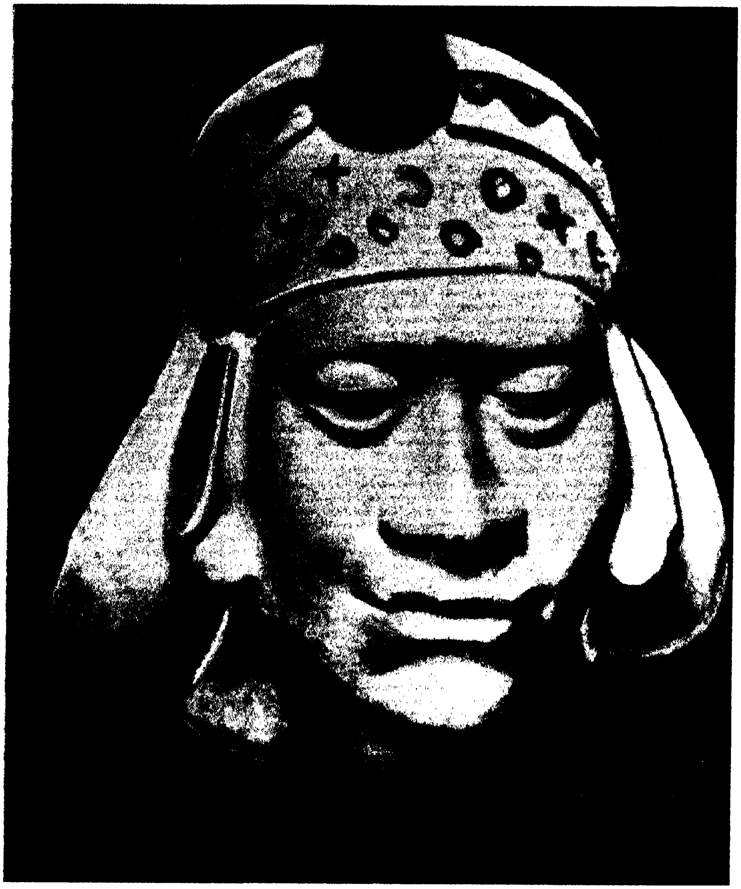


Early Chimu pottery jar of bearded man, from the Chicama Valley, North Peru. (Photo: Mus. f. Völkerkunde, Berlin.) Peruvian traditions speak of a foreign race of bearded men who came to Peru to institute culture, before they finally left across the Pacific, long before Inca time. Their leader, referred to as Tici in the highland and Con on the coast, became the venerated culture hero of the vast Inca Empire.

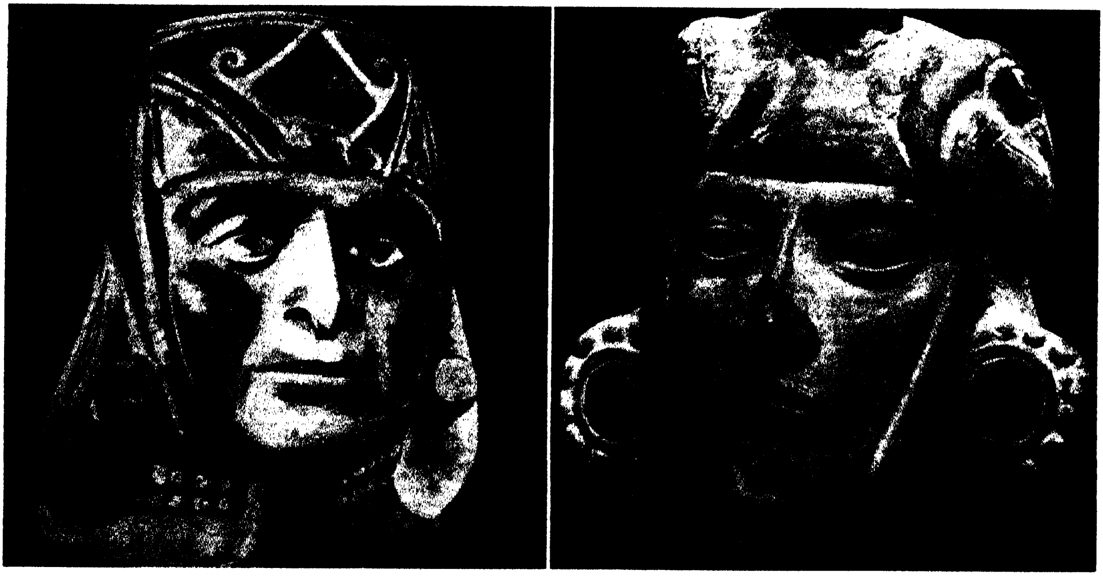


“Bearded men” from the Chimu area of Pacific North Peru. **1, 2, 3** were modelled during the Early Chimu period, in the first half millenium A. D. or earlier. **4** is from the subsequent Late Chimu period. (Photos: 1 *Ethnographical Mus., Gothenburg*; 2 *Lehmann 1924*; 3 *Amer. Mus. Nat. Hist.*; 4 *A. H. Verrill and Brooklyn Mus. N. Y.*)

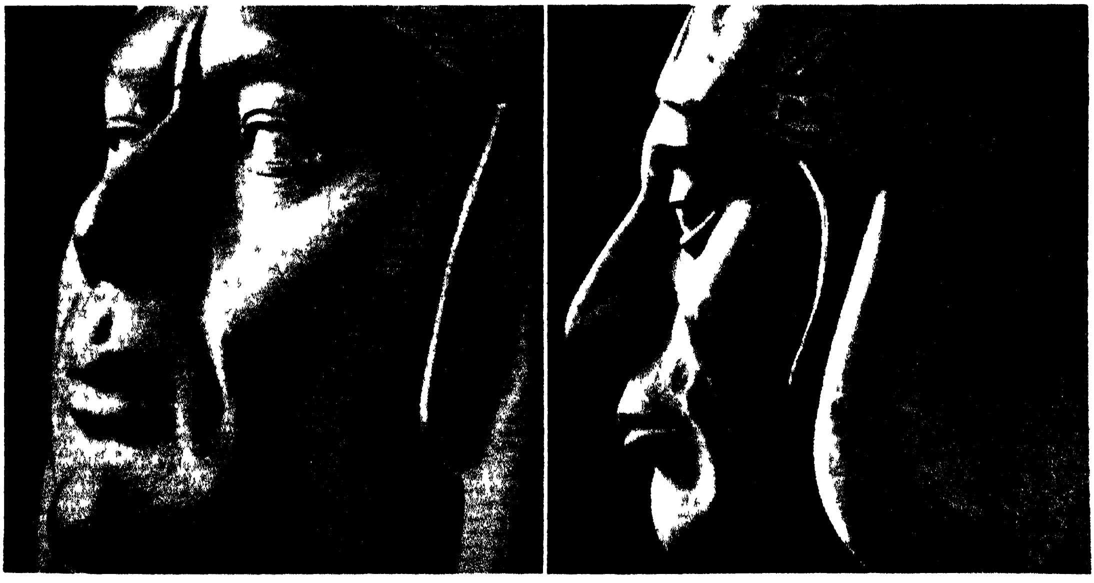


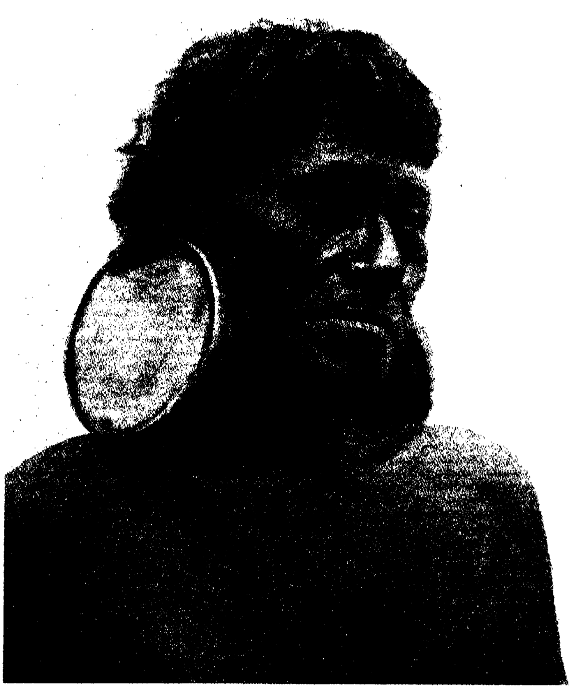
Physical types of an extinct people. (From *Leicht 1944*.) The Early Chimu high-culture is renowned for its realistic pottery portraits in contrast to the conventionalized and symbolic art of most of Peru.

Although no such realistic portraiture was made in Tiahuanaco or on the South and Central Coast, the highland traditions claim that Tiahuanaco was built by a race of white and bearded men, for whom the first Europeans were mistaken; and on the coast are found mummies with European-like race-traits.



Early Chimu types. (From *Leicht 1944*.) The intelligent and determined physiognomies of these prehistoric chiefs testify what the remains of their culture show, that the Chimu Coast was occupied by men of creative strength and enterprise in the very centuries when Polynesia was first discovered. Pre-Inca Peru was the centre of activity for a variety of race-types, including a culture-bearing aristocracy with certain European-like characteristics.





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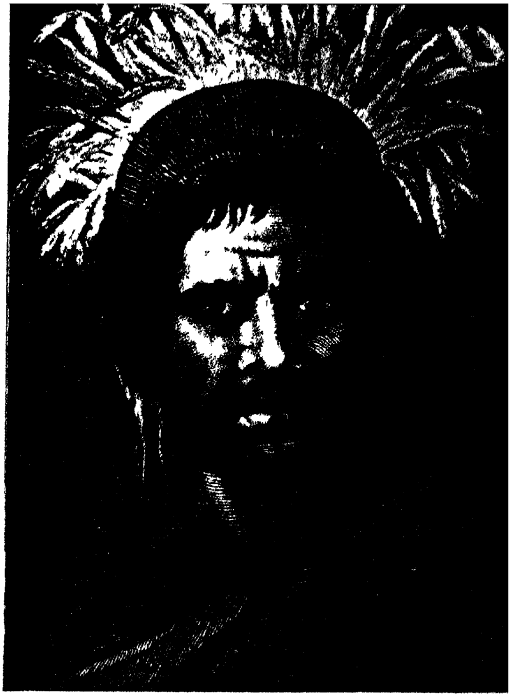

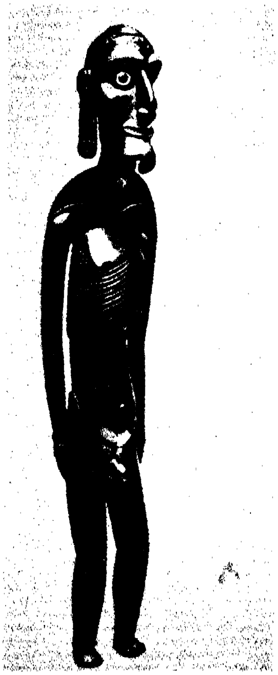

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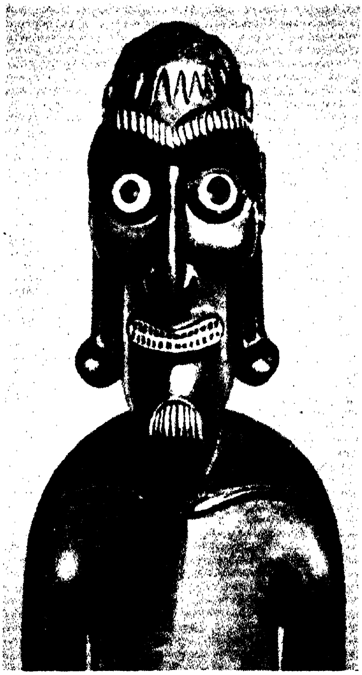

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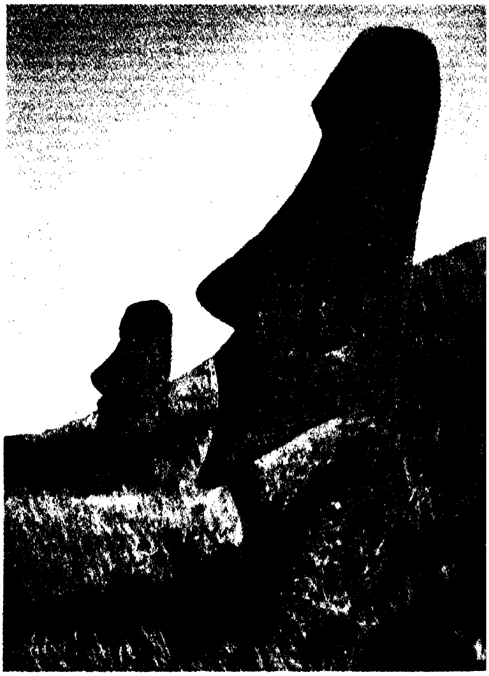

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"Long-Ears" of Peru and Easter Island. Inca tradition refers to Tici as leader of a "large-eared" people, and state that when he left for the Pacific his last lesson to his subjects of Peru was how to extend their ears. **1** Modern savage of North Peru with plugs to enlarge his ears. (From *Tessmann 1930*.) **2** Easter Islander with extended ears. (From *Cook 1777*.) **3, 4** Wooden Easter Island ancestral figure with extended ears and goatee beard. (From *Chauvet 1934*.) **5** Easter Island stone statues with long ears and pointed chin indicating beard. (From *Routledge 1919*.)

Central America, Colombia, and Ecuador. We know, too, that the same simple and natural expansive movement was followed by the better equipped Spaniards in a single generation. If we therefore assume that some of the nameless American bearers of high-culture of the vast intervening period might also have reached the Chimu area of North Peru by similar exploration, they would have been too late to discover and settle virgin Peruvian land, but could have brought along with them Mexican cultural principles and thus cause impulses which would stimulate great local activity and evolution among the existing archaic and indigenous cultures. As a race element they would come among the aborigines as a numerically rare but intellectually significant component, probably forming, much like the earliest Spaniards, a culture-bearing aristocracy or an outstanding social caste. We shall see how such a hypothesis matches known archaeological facts. Kroeber (1930 a, p. 108) in his important survey of the archaeology of the nuclear culture area of the North Peruvian coast, stresses, like many others, the absence of any local sign of gradual culture development. The earliest evidence of the classic Early Chimu high-culture appears archaeologically as already developed, "of well specialized type"; and, "As elsewhere in Peru, no trace has yet been discovered of beginnings." He shows that the Early Chimu is typical Peruvian in general character, "and any attempt to connect it with Ecuador, Central America, or Mexico can be valid only in so far as it also takes account of relations between other parts of Peru and those countries".

Kroeber (1925) also presents evidence to show that, at the ancient level where classic Early or Proto-Chimu high-culture suddenly appears, the bearded race-type was already found to be present on the beautiful effigy jars. Two realistically modelled and painted representations of a Caucasian-like race-type with sharp, narrow nose, big eyes, and a well-groomed beard falling down below the chest (see Plate XXIII **3** and **4**), were excavated among other art manifestations in an Early- or Proto-Chimu site right at the foot of the Pyramid of the Moon at Trujillo (Moche). Kroeber (*Ibid.*, p. 199) writes: "As to the antiquity of this ware, and its priority to any other yet found at Trujillo, there can be no reasonable doubt." Bennett (1939, p. 36), reproducing the effigy jar seen in Plate XXIII **2**, identifies it as grave ceramic of the Early Chimu style, and adds: "The face is distinctly modelled with deep inset eyes and black moustache."

As stated, a growing number of observers refute the extreme evolutionist hypothesis that aboriginal Americans of the inter-tropical zones remained immobile from the day their earliest ancestors settled their respective areas to begin their first steps toward true culture. Groups of high-culture peoples are also capable of movement, either through pressure or when tempted by trade or explorations. A sudden blossoming and later abandonment of comparatively homologous cultures, all on the verge of forming fully developed civilizations, present their geographical pattern as prehistoric stepping-stones in the unstimulating jungle area between Mexico and Peru. Such a culture pattern in this particular coherent area, some writers point out, would hardly have been possible had not the primitive local jungle-dwellers been temporarily visited and influenced by a more or less common cultured source.

Leicht (1944), too, discusses the old question of how high-culture arose on the early Pacific coast of North Peru. He shows that a fundamental cultural standing, based on Pacific fisheries and a certain degree of agriculture, had been acquired by the aboriginal settlers long prior to the appearance of the Early Chimu high-culture. This is the conclusion to be drawn also from Bird's local excavations, and the Carbon 14-datings of these. To this statement Leicht adds the following interesting reasoning (*Ibid.*, p. 15):

"But there is no archaeological testimony to the effect that the subsequent culture of the Chimu grew gradually from that of the earliest inhabitants. On the contrary, even the earliest Chimu art is readily distinguishable from the finds which come down from the primeval inhabitants. Already in its most ancient state the early Chimu reveals distinct connections with the Central American culture, ... There can hardly any longer remain reasonable doubt that the Chimu ancestors, possessing already a culture that had bypassed the archaic state, immigrated from the north roughly about the 2nd. or 3rd. century A. D. They may have passed the narrow Panama isthmus by land, in spite of the presence of savage forest-Indians with poisoned arrows, and, while continually following the river-banks, have slowly advanced over the highlands to the south, where the lateral valleys and the water led them once more out of the mountains to their subsequent dwelling-places along the coast.

"However, by far the greater number certainly arrived by way of the much simpler ocean route along the coast. We shall to-day have to put the timing of early mankind's boat-culture back to a much earlier period than has formerly been done. ...

"One does not, have at once to turn fantastically to early Phoenician merchant fleets or to the South Seas to assume an immigration of culture-bringers by sea. The Chimu at the time of the discoveries still possessed several efficient sea-going craft, which excited the greatest astonishment among the Spaniards, and which were certainly no new invention, but had long been in the possession of the Indian population of the coast.

"Ruiz, Pizarro's brave and experienced pilot, had not come far down the coast on his voyage to explore Peru, when he was surprised by the sight of a peculiar Indian craft which appeared to him from the distance to be a caravel of considerable size on which a powerful sail was stretched out bellying in the wind. The old sailor was not a little astonished at the sight, as he was firmly convinced that no European ship had ever been in these latitudes before him. As he came nearer, he saw that it was a giant raft ...

"This simple but effective type of construction was more than sufficient for navigation along the coast, and such *balsas*—on which there were straw-covered huts and accommodation—have served the natives for transportation along the coast and on the greater rivers even after the conquest of the land by the Spaniards."

Leicht (*Ibid.*, p. 18) also shows that, until the arrival of the Spaniards, the natives of the Chimu coast had maintained a firm and detailed tradition concerning the immigrant origin of one of the early local cultures. He refers to evidence collected by Miguel Cabello de Balboa, an intelligent and learned Jesuit of the middle of the sixteenth century:[1] "In times so old that nobody could express it any more, a great fleet of foreign Indian *balsas* appeared with many sails on the coast of the region of Lambayeque. The rafts came from the north and stopped at the mouth of the river Faquisllanga [Rio Chancay?]. A powerful monarch disembarked, accompanied by his wife, numerous secondary wives, and a host of people who faithfully and devotedly followed their emperor."

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[1] A copy of Balboa's MS with original text is preserved in the New York Public Library and will be quoted in Part VIII.

We are given the names not only of the emperor and his wife (Naymlap and Ceterni), but also of some of the forty principal and selected men who formed the royal court, as well as the function of each of them, from the ceremonial conch-blower to the royal feather-dress maker and the master chef.

The party moved a short distance inland to build their first town, bringing great riches and strange properties never seen before in those parts, even a ready-made image carved in green stone representing their lord, which was raised in their first temple. A genealogy of eleven generations with named kings follows after the death of the immigrant emperor, and then the dynasty ended in superstition and riot when the last priest-king was suspected of causing a drought through his unsuccessful attempts to transport the green stone statue away from its original temple to another site. After the fall of this dynasty another era followed, and other tribes held power in the land before the Late Chimu and Inca periods.

Leicht (1944, p. 20) is the first to mention the interesting analogy and possible connection—direct or indirect—between this green stone image and the analogous six-foot so called "Raimondi monolith" of a culture-hero, carved in greenish diorite, which was discovered at Chavín de Huantar, a considerable journey inland. A direct cultural connection between the early Chavín and Chimu reigns is at least generally recognized, and will be discussed later.

Lehmann (1930, pp. 336, 337), too, maintains that there were reasons to suspect that "the Naymlap culture originated in Middle-America". He writes: "Balboa's account of Naymlap and his company and successors shows certain conformities with Toltec traditions. This has been pointed out by Krickeberg too... The Chot temple which Naymlap built is probably preserved in the stepped pyramid which lies about 4 kilometres from Eten and to the left of the road leading to Reque. It was about this pyramid that Middendorf early remarked that it most resembled the buildings in Central America and Mexico."

Leicht hardly intends to argue that Naymlap's fleet of balsa raft voyagers necessarily represented the arrival specifically of the Early Chimu dynasty, but rather that the coastal road lay wide open—and was probably repeatedly used—between the territories of the Central American peoples and the Pacific sea-coast of Colombia, Ecuador, and Peru. An immigrant fleet approaching Peru from Central America would naturally reach first what was to become the northern Chimu coast. This was in fact to remain the headquarters of Inca navigators and seafaring merchants right up to historic times. A principal reason for this was the easier access to balsa and other light timber in North Peru than, for instance, in Nazca territory. These practical considerations combine to give the Early Chimu and their local predecessors a key position for the coming and going of cultural impulses and culture-bearers to and from prehistoric Peru.

Inca history sends the Viracocha emigrants northwards from Tiahuanaco and down to the coast in the heart of the Chimu territory. This tradition would at a first glance make the Chimu area recipients from Tiahuanaco, as far as the reception of the bearded Viracochas and their culture were concerned. But, it will be recalled, the bearded hierarch of Tiahuanaco (if the legend is to be accepted literally) sent all but his nearest followers ahead of him with given itineraries and a rendezvous on the northern coast. The (two) remaining followers were directed to the same destination by way of the coastal and inland slopes respectively, independently of the route followed by Tici Viracocha. Thus the area leading to the place must already have been fairly well known to the Viracochas, and it is thus possible that they selected for their own exit the same locality which had once served as an entry for their tribal ancestors: In that case, the Early Chimu area and the northern coast would in the first place represent a stepping-stone for the original spread of high-culture to Tiahuanaco, and later an exit for emigrants leaving their abandoned highland site en route for the coast of Ecuador.

It is interesting to note that the Chimu, according to Zarate (1555, Chap. X. p. 48), also preserved a distorted early myth antedating even the arrival of King Naymlap and his balsa raft fleet, according to which a supreme divinity, namely Con (Kon), had arrived from the north. He was their creator, the son of the sun and the moon, and could shorten or prolong the roads, and raise or flatten hills as he pleased. He gave the population newly created plants and fruits to eat, but as the Indians of the plain had caused him some trouble, he revenged himself by causing drought, which shrivelled up their lands and only permitted some drinking-water to descend in the streams from the highlands. In the end another powerful person, Pachacama, who also said he was creator and son of the sun and the moon, had arrived from the south. He was stronger and on his appearance Con fled the coast and left the people he had created without a leader and protector.

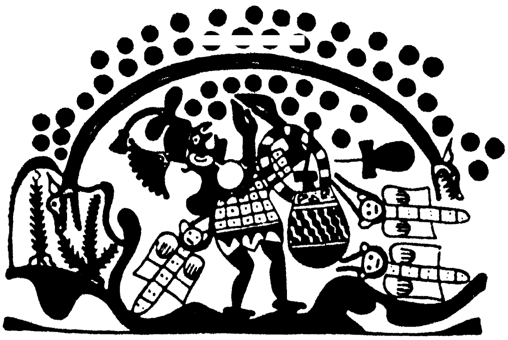
Tschudi (1891, p. 179) discusses the Con myths as told by several early chroniclers, and while showing that they originate in the Chimu area, observes that Pachacama in some cases was memorized as the son of Con. Further (*Ibid.*):

"Again, according to another tradition, Kon had not arrived alone, but together with companions. After he had given the people laws and had instructed them, he was supposed to have become dissatisfied because they did not obey, wherefore he set out along the coast for the province of Manta, and having spread out his mantle on the ocean, he had seated himself on it together with his companions and hence disappeared. This version of the Kon-myth in no way refers to Kon alone, but, as will be seen, is an amalgamation with the Viracocha-myth. Kon was originally esteemed independently of Viracocha."

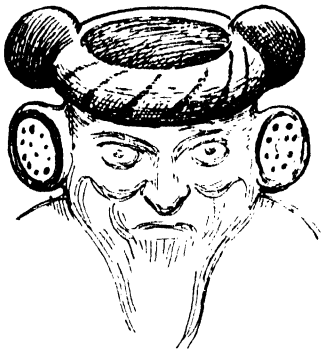
Thus we see, as with the Quetzalcoatl of the Aztecs and the neighbouring Kukulcan of the Mayas, so also with the Viracocha of the Inca and the neighbouring Con of the Chimu: the itineraries and details pertaining to these culture-heroes and their activities are so consistent that adjoining nations, when fused together in subsequent cultural periods, recognize their own culture-hero in that of their neighbour and hence freely interchange his name. Thus the Tici of the Tiahuanaco hierarchy and the Con of the Chimu was freely referred to in the final Inca period of the pan-Peruvian Empire as Con-Tici, even with the descriptive Quechua suffix Viracocha—"Sea-Foam".

Conventionalism and symbolic art representations

We have seen that the *horned serpent* was the specific symbol of heaven among the early Zapotecs of Mexico as well as among the Mayas of the Old Empire, being placed as a symbolic ornament on the costumes of local priests and deities; and that it reappears carved in relief both on the Mocachi and the Tiahuanaco bearded statues on the Titicaca plateau. It even appears to a marked degree on the Tiahuanaco-inspired statues at Huancane. (Plate LII **5**, **6**; Rydén 1947, p. 91.) On the coast of North Peru we find the inter-



The symbol of the double-headed serpent. (From Kutscher 1950.)



Headwear of "the well-known bearded old men" in Chimu art. (From Montell 1929.)

mediate link. Horned serpent motives appear here with striking frequency on the headgear and costumes of deities and heroes depicted in symbolic art. The iconographic representation reproduced above after Kutscher (1950) leaves no doubt that the horned serpent directly represents heaven in the ideographic art of ancient North Peru also.[1]

To the knowledge of the present writer, no ideograms beyond step-signs, spirals, and modified swastica symbols are found on the purely realistic effigy jars portraying the bearded Early Chimu men, although markedly horned serpents are often painted as an ornament on the headwear of ceramic portraits of other aristocratic Early Chimu individuals of the same strangely Caucasoid type. (E. g. Plate XXVII.)

In Peru Viracocha was always remembered with a plain tonsure or band round his forehead; he was also carved thus in the highland monoliths, and the bearded Chimu effigy vessels were always so ornamented.

Studying prehistoric Chimu types of headgear through an analysis of the effigy jars, Montell (1929, p. 51) says: "In some vessels the head carries only a ring formed by spirally twisted cloth or yarn, ... This arrangement generally occurs uncombined with any other component of headgear, but is occasionally provided with two erect wings at the sides [see fig.]. Of the well-known bearded old men this is especially characteristic ..."

Describing a peculiar type of *horned headdress* from North Peru, Kroeber (1925, p. 220) says: "The proto-Chimu winged fillet of the bearded men may be a prototype, but it is lower and not a complete head covering."

These observations recall corresponding head ornaments which survived till historic times on the nearest island groups in Polynesia. Thus Stewart (1832, p. 161) wrote of the native headwear in the aboriginal Marquesas group: "Their turbans are of various shapes; the most common consists of a piece of native cloth, of the size of an ordinary pocket-hankerchief, bound closely to the head, having the ends twisted into a large knot immediately in front, or on one side over the temple. The ends of others are longer, and formed into large puffs or cockades on the tops or sides." Also Linton (1923, p. 419) cites early visitors to the Marquesas: "When the hair was dressed with two knots the centre and back of the head was shaved, the tapa wrapped knots protruding like horns from the bare skull."

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[1] Kutscher (1950, p. 200) says: "As Doering has indicated, the Chimu, as well as the ancient Mexicans and Maya, symbolized the heavens as a double-headed monster." As the serpent symbolizes the sun-ray, we may well presume that the arched body of the snake, as seen above, represents the arched path of the sun across the sky, with a head at each extremity symbolizing its termination at sun-rise and sun-set. The horn, often taking a directly triangular form, or sometimes the shape of a pointed and erect ear, is not so readily interpreted, and therefore hardly independently invented.

Robertson (1766—68, p. 228) wrote on the discovery of Tahiti: "...there was one Venerable old Man in one of this canoes, that all the rest paid a particular respect too, he was cloathd better nor the rest and Wore a White turbent about his head, and a pretty long gray beard,..." Robertson described this native as belonging to a local "Race of White people" having "a great resemblance to the Jews".

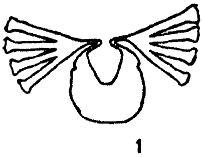
Describing the often strongly bearded race-type among the obviously mixed inhabitants of aboriginal Mangareva Island, Beechey (1831, p. 137) says: "... when their heads are covered with a roll of white cloth, a very common custom, they might pass for Moors. It is somewhat remarkable that we perceived none of the fourth class, or those more allied to negroes, thus habited, but that it seemed to be confined to those of the lightest complexion."

Beechey's description of these deviating Mangareva individuals, with their light complexion and the white cloth-roll round their heads, their growth of beard (which in one individual reached the pit of the stomach) and a nose which "in general is aquiline", strangely recalls the human type depicted on the Early Chimu effigy jars, and it is noteworthy that the water bearing down upon Mangareva comes constantly in a rapid current which arches directly down from the coast of what was the Early Chimu kingdom.

If we are to consider the possibility that a guiding influence behind the high-culture developing at Tiahuanaco had its roots further north, among the coastal Chimu and the highland Chavín, then it would be reasonable to suspect that these in turn had developed locally out of culture inspirations coming south from coastal Ecuador or inland Colombia (San Augustin), and these perhaps again from somewhere on the Isthmus, or from early Mexican culture centres. In this way an underlying relationship, limited to general and basic conceptions rather than distinctive details and tribal art-styles, may bind together the geographically coherent American area of high-culture and reverence for early men with light skin and beards.

Certain observers cannot consider it likely that there were other physical types present in early Peru than those which inhabit its villages of to-day. Since the present Aymara and Quechua Indians are a beardless people, they reject the idea that bearded men might have been known to the early Peruvian peoples. This way of stabilizing races to sites—which would lead to strange results if generally applied in anthropology—makes it necessary to propose that local traditions relating to beards are the results of native imagination, and that prehistoric portraits *depicting* beards are meant to depict something else. Thus Rydén (1949), stressing that the present Colla Indians around Tiahuanaco "are just as 'red' as are all other Indians and their growth of beard just as minimal", deduces that people in that locality cannot have been otherwise in times past. He thus finds it necessary to explain away the bearded pre-Inca portraits. With regard to the bearded statues of Mocachi and Tiahuanaco, he claims that the term "beard" after all is merely a convenient name, and "that which represents the beard might as well be a nose-ring".

This hypothesis is difficult to explain, seeing that the carved beards in question do not



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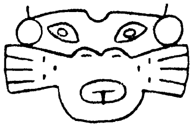
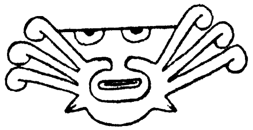
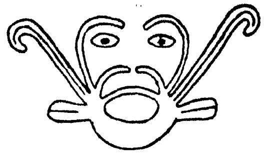
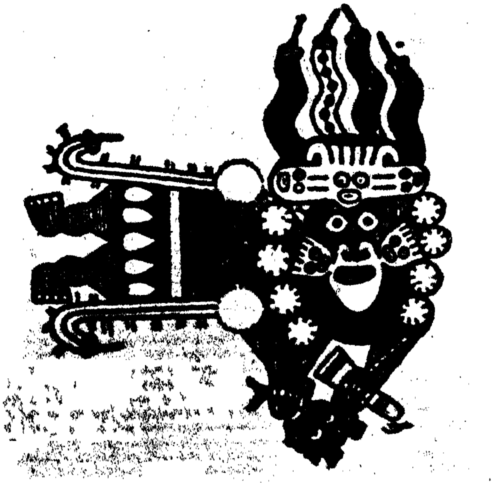






even touch the nose, and Rydén has to go outside Tiahuanaco to support his statement by a comparison with some of the coastal pottery jars. Instead of consulting the Early Chimu effigy jars, which represent early Peruvian portraits in a purely realistic style—and in which the beard cannot possibly be mistaken for a nose-ring—the author has recourse to the Nazca jars, which are known as the antithesis of Early Chimu pottery because they are not modelled in human form, but only painted with the highly conventionalized symbols and abstract stylistic patterns typical of Nazca art. Thus, while the realistic Chimu beards by their shape and colour could settle the problem without further discussion, the almost surrealistic Nazca beards may at first seem to drag the argument out indefinitely. Presenting the four figures reproduced above, Rydén (1950) shows that the first specimen actually is a Nazca face-ornament of gold, the three others being corresponding lines painted on Nazca ceramics. It could be added that this type of conventionalized Nazca conception is suspiciously common, not to say dominant, on the stylized faces depicted in their local art. (E.g. fig. **5**.)

It would indeed be natural to go further and ask: why is it so common? what does this strange outgrowth on the lower face symbolize to the Nazca artist? and why did the Nazca native select even for his own embellishment that strange golden face-ornament the purpose of which was to give himself the same appearance as the heroes symbolically represented in the potter's art? We know that to the Nazca artist each stylistic design, each zoomorphic limb or item, had more than an ornamental value; they invariably had a



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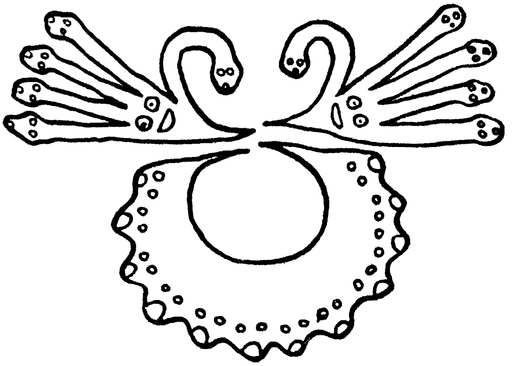

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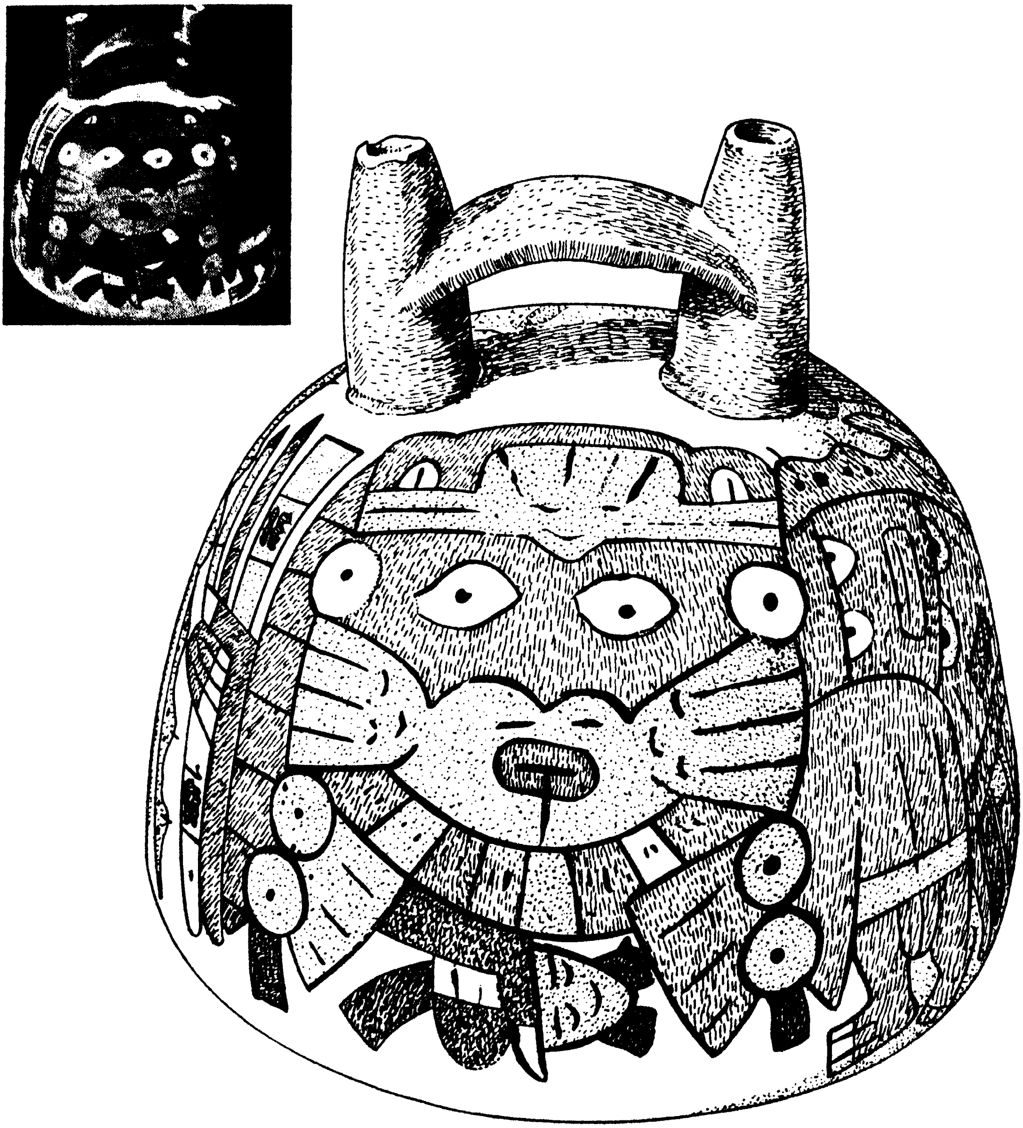

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specific ideographic significance as well, the subject matter generally being selected from mythology.

It is not difficult to identify the facial attachment thus depicted by the Nazca artist, and it has been done most effectively. Lehmann (1924, p. 32, with Doering) in his art history of early Peru, illustrates the "Golden Mouth- and Nose-ornament" of the Nazca as reproduced in fig. 6. Without commenting on the lower piece, he shows the upper ones to symbolize whiskers. This he deduces from the fact that feline heads in Early Nazca art are depicted with such whiskers in rather naturalistic form, developing later into a more

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stylised and independent design identical with the fan-shaped side-wise face-projections under consideration. Now, if the upper pieces are whiskers, the wide lower band that goes with it (fig. **6**), or is attached to it (fig. **1**), can hardly symbolize anything but a beard.

When Rydén selected the conventionalized Nazca motive reproduced in fig. **2** above to illustrate his case for a "nose-ring", he possibly did not know that Leicht (1944, p. 316), six years earlier, had already reproduced the full design shown in fig. **7**, and that he had then identified the supposed "nose-ring" as the typical and exceedingly common Nazca symbol for the "cat-demon" or the sacred puma-face. The "nose-ring" was simply the stylized "whiskers" of the cat. The puma whiskers, and indeed the entire feline symbol, are well known as intimately associated with the creator-god and the Viracocha worship in all parts of early Peru.

As may be judged from the whiskered cat ideogram in question, when reproduced in full, Nazca symbolic art is indeed less dependable as a guide to the judging of human

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race-types in prehistoric Peru than is the naturalistic art of the Early Chimu further north on the same coast.

As already stated, when the whisker design as identified from the pottery paintings is worn independently by the natives as a human face ornament or golden mask, the whiskers are completed by the additional chin piece, which thus can only represent the remaining Viracocha feature missing from the whiskered puma: the beard. The golden beard and whiskers of fig. **6**, worn as a face mask by the beardless Nazca, are both ornamented with snake-heads at the extremities, the symbol of light and of the sun-god. The Nazca sun-god was *Pacha-Camac*, closely associated with the Chimu *Con*, the Tiahuanaco *Tici*, and the Inca *Viracocha* cycle. The extremely stylized mask of fig. **4** has included even the eyebrows in the coherent pattern of facial hair. So had also the bearded Tiahuanaco statue when seen from the side. This was the observation which encouraged Rydén to suggest that the bearded Tiahuanaco statue was meant to depict a man with a beard-like Nazca "nose-ring" rather than a real Chimu beard. Since, however, the Nazca "nose-ornament" actually is to be interpreted as a "beard-ornament", then the circle is again closed.

In fig. **8** is reproduced the head of a Nazca effigy jar in Musée de l'Homme, Paris, where the stylished beard of a human head is moulded in free dimensions, leaving no doubt as to its signification. Again, the two Nazca heads reproduced in fig. **9** and fig. **10**, where moustache and beard are painted in unmistakeable and simple lines, belong to the type of Nazca ware which is somewhat more realistically painted. The eyebrows and moustaches in the one case (fig. **9**) are both represented in exactly the same way.

Somatological evidence

Diversity in local cranial forms

The burial remains of prehistoric Peru provide us with a number of mummified bodies and a vast quantity of local Indian skulls for our consideration. The skulls will represent the population at large, whereas the mummies—at least where artificial mummification is involved—may give us a wrong average of the population as a whole, as they may principally preserve for us members of the upper social classes important enough to be honoured with this form of burial. But this possible selectivity should not exclude the elements for which we are searching.

As is well known from the numerous prehistoric skulls analysed throughout Peru, the cranial indices do not follow the brachycephalic norm of the Yellow-brown race. Peruvian skulls are heterogeneous in type, and although brachycephaly is dominant among the Indians of historic times, dolicocephaly was common in many parts of Peru in early prehistoric times. Provided that cranial indices are at all a dependable means of judging race or physical types, we find then that the early local inhabitants are either—like the Polynesians—of mixed origin, or else have, locally or inside the Americas, evolved into subgroups, some of which diverge widely from the general cranial norm of the Yellow-brown race. Therefore, we do not necessarily have to suspect a Melanesian element in the Polynesian dolicocephalic component like that which is particularly noticeable in Easter Island, furthest from Melanesia and nearest the South American shore.

In his "Metric Study of Undeformed Indian Crania from Peru", Newman (1943, p. 42) shows that in general the highland crania are more long-headed, the coastal ones more short-headed, with index variations roughly from 75 to 84. He says: "Speculation as to the origins and relationships of the one coastal and two highland physical types is idle until more data are available." Since the short-headed form dominating the coast concurs with the Yellow-brown or Mongoloid norm, it is interesting to find that long-heads existed right in their midst during the Early Chimu period. Kroeber (1944, p. 56), like Uhle, Larcos, and others, points out that the majority of undeformed Early Chimu skulls are *long*.

If we go straight to Tiahuanaco, we find within this limited Andean site that prehistoric people with entirely diverging head-forms have been buried there side by side. Chervin (1908, p. 139), in the craniological volume of his *Bolivian Anthropology*, presents a table of cranial indices from Tiahuanaco, showing that they range from 71.97 to 93.79. This covers the whole scale of human head forms between dolichocephaly and ultra-brachycephaly,[1] a variation which is too marked to make it reasonable to suppose that one homogeneous tribe has inhabited this site throughout its era of habitation. Two rather extreme cranial forms within the Tiahuanaco-dominated area are reproduced in Plate LXXXV **5** and **6**, both pertaining to aboriginal natives of the Bolivian highland plains south of Titicaca. The series to the right represents a long-headed and narrow-faced cranium of great antiquity, excavated from an early grave on the actual Tiahuanaco site. Neither artificial head deformation nor individual index freedom among relatives of one homogeneous tribe can fully explain such thoroughgoing differences in head-form.

It is true that head flattening was formerly very common in these regions, and even circular cranial deformation (*deformatio fronto-sincipito-parietalis*, Gosse 1861) which is less easily detected than simple head-flattening. But furrows in the skull caused by tight bandaging, as well as a bulging of the intervening sections, generally betray artificially deformed skulls and prevent their entry into index tables as undeformed specimens. Since neither of the two most extreme head-forms of Tiahuanaco can be produced merely by artificial modification of the other, at least not without obvious traces of deformation, we should have to assume that some intermediate form was natural, and was occasionally lengthened and occasionally shortened. But since the purpose was to acquire the tribal ideal of beautiful or aristocratic head-form, it is hardly conceivable that members of one community strove for *opposite* results unless they wanted to stress some racial distinction between them. Certain it is that the frequent occurrence of artificially deformed heads cannot explain away the existence of a marked difference in natural head-forms in early Tiahuanaco. Here, as among the Early Chimu, a long-headed type has lived among short-headed people of the Yellow-brown norm.

Occurrence of Caucasoid hair on local mummies

Fortunately we are not restricted to the analysis of cranial form in our determination of a racial complexity in early Peru. As well is known there is a considerable number of more or less well preserved mummies. Some of these have been deliberately embalmed (Dawson 1928; Candela 1943; Stewart 1943; etc.), while the majority seem to have been preserved by the favourable conditions of burial in dry desert sand as in many of the great necropolises typical of the Peruvian coast.

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[1] 70—75 dolichocephaly; 75—80 mesocephaly; 80—85 brachycephaly; 85—90 hyper-brachycephaly; 90—95 ultra-brachycephaly.

Already in the latter half of the last century, the Peruvian mummy-heads collected by Blake, Hutchinson and others startled European anthropologists by including physical elements thought to be alien to the Mongoloid or Yellow-brown aborigines of early America. Busk (1873, p. 313), while quoting a previous remark by Blake that the colour and texture of the hair on certain Peruvian mummies indicate essential differences from that of known Indians, said himself of a selection of Peruvian mummy heads presented by Hutchinson to the Anthropological Institute: "The hair which is so abundant upon many of the crania on the table is, as will be observed, by no means coarse, but rather fine and silky—nor is it truly black, but rather of an auburn tint, . . ."

Busk suggests that the hair might possibly have been black originally and had only changed its colour *post mortem* through exposure in the sand. But since the proposed bleaching effect of the sand cannot account also for the remarkably non-Mongoloid texture of the hair, he admits that the fineness may be an argument in favour of those who suspect a different type of man from the coarse-haired Indian otherwise dominating early America. The hypothesis of the bleaching effect of the sand on the hair of all brown-haired Peruvian mummies is reasonable, but not conclusive. Nevertheless it has not been seriously tested, but has been accepted as plausible to account for the same sort of local discoveries until recent times, merely because there has not been any other reason to suspect the existence of non-Mongoloid elements in this locality, until here, when the search for the origin of the non-Mongoloid element in early Polynesia is focused on pre-Inca Peru.

Apart from the Caucasoid silkiness of the otherwise auburn hair referred to above, there are two other frequently occurring arguments against the conclusiveness of the sand-bleaching hypothesis. Firstly, we should expect that all local mummies of corresponding antiquity would acquire the same auburn hair when buried in an identical manner; secondly, the theory would at least require that the hair of the mummies under discussion should actually have been exposed in sand. In the light of available evidence none of these conditions are satisfied in Peru. Among ancient Peruvian mummies deposited under the same conditions, some have the blue-black hair of the Mongol, others the light brown and auburn hair otherwise characteristic of the Caucasian race.

When describing the brown, soft, and wavy hair on some of these South American mummies, Wilson (1862, p. 235) already contrasts them with specimens found by him in Indian graves elsewhere: "In all these the hair retains its black colour and coarse texture, unchanged alike by time and inhumation; . . . In this respect, therefore, the disclosures of the ancient Peruvian cemeteries of Atacama reveal important variations from one of the most persistent and universal characteristics of the modern American races; nor is their evidence less conclusive as to the essential diversity in cranial conformation."

No less important is the fact that countless Peruvian mummies have been discovered, not buried in the sand, but in stone-walled and roofed burial vaults, or even in roomy burial caves like those at the Paracas peninsula. The hair of these has not been exposed to the sand at all, nor even to the light. Some of these mummies, which, furthermore, have been closely covered by unfaded and brilliantly-coloured blankets and hoods, have still revealed a soft brownish hair when the hood has been lifted.

These circumstances combine to show that it is at least dangerous to argue from the mummy-finds that none of the prehistoric peoples in Peru had brownish hair. When the ideal conditions of a dry cave burial leave wool and cotton tapestry and mummy-covers in their original and brilliant colours, and yet the mummies inside occasionally have brownish hair, then the conclusion is that a *post mortem* fading must have effected the well-protected hair but not its covering,—a rather unlikely happening.

Suppose that formerly living people represented by the present mummy-bundles in Peru actually had included individuals with fine brown hair, the sweeping assumption that all brown hair among these mummies must have faded from an original bluish-black would remove all possibility of identifying them. The only way of securing conclusive evidence, in our day, that some of them had brownish hair, would be if some thoughtful aboriginal had taken hair-samples of some black-haired and of some brown-haired individuals, tied each up separately with string and deposited them all together in one basket and in one burial vault, where all remained together under exactly the same conditions until opened by the anthropologist in modern times. There would then be two possibilities:

a) The modern discoverer of the basket would find only brown hair samples. In that case he could not safely deduce anything, since the black samples might possibly have turned brown in the basket.

b) He would find some black hair-samples together with the brown ones. In that case he would know that the brown ones were natural and not faded, or else there would have been no black samples in the basket.

Strangely enough, this particular experiment has been carried out in detail: The early American superstition as to the magical properties of human hair (Luomala 1940, p. 49), which is so marked also among the Polynesians (Buck 1922, p. 40), impelled some early native of Chacota Bay, on the Pacific coast below Tiahuanaco, to place a whole selection of hair-clippings from different relatives in the grave of a small but well equipped family. The grave, described by Wilson (1862, Vol. II, p. 228; italics by T. H.), contains the mummies of a man, a woman and a child, evidently persons of some distinction. Together with their still bright-coloured personal belongings and some food and coca-leaves there are also some bags of finely woven texture, all in a perfect state of preservation. In these are "locks of human hair, each secured by a string tied with a peculiar knot. All the hair is of fine texture, of various shades, *from fine light brown to black*, and to all appearance has undergone no change. ... In this family tomb, in which lay the parents with their infant child, we may assume with little hesitation that we have the locks of hair of the surviving relatives: in all probabilities of elder members of the same family as the infant interred here in its mother's grave."

Here the discovery of black and fine light brown hair-locks each secured by a string and placed in the same bag is a perfect example of alternative (b), i.e. that the locks of fine light brown hair cannot merely be faded, or the black locks would not have been present among them.

About the infant itself we further learn that its scalp "is thickly covered with very fine dark brown hair." And (*Ibid.*, p. 228): "The male mummy is that of a man in the maturity of life, in the usual sitting position with the knees drawn up to the chin. ... The hair has undergone little or no change, and differs essentially from that most characteristic feature of the Indian of the northern continent. It is brown in colour, and as fine in texture as the most delicate Anglo-Saxon's hair. It is neatly braided and arranged, the front locks being formed each into a roll on the side of the head, while the hair behind is plaited into a triangular knot of six braids. The garments and wrappings of this mummy were of fine texture, woven in woollen materials of diverse colours; and the head-dress was first an oblong hood with particoloured stripes, and over this a cap formed of woollen threads of various colours, ingeniously woven, and surmounted by feathers and an ornament formed of the quills of the condor. ... The body of the female from the same tomb presents in general similar characteristics. The hair is shorter, and somewhat coarser, but fine when compared with that of the northern Indians. It is of a light brown colour, smooth, and neatly braided across the upper part of the forehead, then carried backward and secured on each side of the head."

This little family seems to be of high cultural and social standing to judge from dress and ornament, and in all probability of somewhat mixed descent, to judge from the different hair-samples of ancestors or relatives which were placed in their grave.

Wilson (*Ibid.*, p. 246) strengthens the evidence of the hair-samples from this Chocota family grave by describing another discovery amidst the grave-finds in the same neighbourhood. This second find was an embalmed mummy-head:

"The head was found detached, and carefully preserved without the body. It appears to have been prepared by desiccation, without the use of resins or other antiseptics, and was enveloped in a thick cotton bag. ... It is unique, so far as the observations of its finder extend, and presents some striking points of dissimilarity to any of the crania already described. ... The forehead is broad and high, the nose prominent, the cheekbones strongly developed, the alveolar edges of the jaws obtusely arched in front, and the incisor teeth stand in a vertical position. The hair which is brown, and slightly grey, is remarkably fine, waved in short undulations, with a tendency to curl. ... The orifices of the ears are filled with tufts of cotton, and the same are passed through slits in the lobuli. Mr. Blake suggests that this might have been the head of some noted curaca or chief of a hostile country taken in battle, and preserved as a trophy; but Dr. Morton refers to the practice of the natives at Port Mulgrave on the Northwest Coast, as well as those of other tribes, of decapitating their dead chiefs, and preserving their heads apart. The same singular custom prevails in the Ladrone and Society Islands, as well as in others of the South Sea Islands, from which it may be inferred that it was not the head of an enemy, but of a person of distinction."

A mutual deviation in head shape between these Chocota Bay finds seems to stress further the existence of local raceblending, although some artificial index modification also seemed probable to Wilson. But the important aspect of these discoveries is that, amidst an aboriginal population known to us as typically coarse-haired, straight-haired and black-haired, some prehistoric mummies have been interred including race-elements with a hair-texture as fine as "the most delicate Anglo-Saxon's hair". We even hear of instances where such remarkably fine hair is "waved in short undulations, with a tendency to curl", and occurs in various shades of brown, even "fine light brown" and "brown, and slightly grey".

Referring to the above-described mummies and the finding of the mixed hair-samples, Wilson himself pointed out (*Ibid.*, p. 232) that: "The colour and texture of the hair are facts of great importance to the ethnologist, as indicating essential differences from the modern Indians in one important respect; and therefore confirming the probability of equally important ethnic differences, suggested by other evidence." The author stressed in conclusion that discoveries such as mummies and bags with fine and silky brown hair on the coast of ancient Peru "go far to disprove the assumed unity of physical type throughout the Western Hemisphere. No feature of the modern Indian is more universal, or yields more slowly even to the effacing influence of hybridity than the long, coarse black hair..."

Only about ninety miles further south on the same coast, a most carefully preserved mummy of an adult woman is described by Dawson (1928, p. 127): "... it was carefully and elaborately embalmed. ... The whole body has been plastered abundantly with some gumlike resinous material mixed with oil of a strongly aromatic smell, and which is deliquescent." We further learn that: "The scalp retains abundant light-brown hair, which is parted in the centre and arranged in two long plaits which hang from above each ear."

We shall later see that supporting finds are made in the cave-burials at Paracas, while at Ancon on the Peruvian coast just north of Callao, Reiss and Stübel (1880—87, Pl. 16, 17) discovered a colourful bundle of beautiful and aristocratic cloth containing human bones, and ornamented by beautiful long and wavy human hair, brown in colour and fine in texture. Through the kind cooperation of Dr. R. Carión Cachot and Dr. L. F. Gálvez of Museo Nacional de Antropologia y Arqueologia in Lima, and of Dr. P. Pawlik of Instituto de Estudios Etnológicos, I have been able to reproduce here for the first time a photographic selection of mummy heads and hair-samples of non-Mongoloid type from prehistoric Peru. The specimens (illustrated in their natural colour in Plates XXXIV—XXXVI) were selected and photographed by the museum staff from some of the extensive and hitherto unpublished material of pre-Inca origin which is preserved in the museum store-rooms.

It may be surprising to find individuals with these non-Mongoloid hair characteristics among the graves of aboriginal Peru, yet it should not be more surprising than to find them among the live inhabitants of adjoining Polynesia. As we have seen in Part IV, the Mendaña expedition and other early European voyagers found sporadic individuals with brown and reddish-brown hair of fine texture, long and wavy, as they pushed with the aid of the trade winds from Peru into Polynesia and adjoining sections of Melanesia. These rudimentary elements on the islands have never been explained, but merely accepted on account of their undeniable existence as an *Uru-kehu* strain that runs through the aboriginal population on all the major Polynesian islands.

Intermarriage with frizzy-haired Melanesians has often been suggested to explain the occurrence among Polynesians of what Wallace (1883, p. 499) terms "the slightly curly or wavy hair which distinguishes them from all Mongoloid tribes." However, the fine silky texture and vague undulation occasionally seen in Polynesian hair is so far from being the result of admixture with coarse-haired, stiff-haired and frizzy-headed Melanesians that Sullivan (see Part IV) found it to concur closely with Caucasoid norms. Also, the rare occurrence of naturally brown or reddish hair is more of an alien intrusion in Melanesia than among the genuine Maori-Polynesians to windward.

We recall from Part IV Buck's statement that the general Maori hair-colour was black, but that brown and reddish hair occurred among certain tribes and was claimed by them as an inheritance from the light-skinned European-like branch of pre-Maori ancestry (the *Patu-paiarehe*). He added: "In the Auckland Museum there is a hank of beautiful wavy hair, obtained from a rock shelter near Waitakerei. That it belonged to pre-European days is proved by the root ends being plaited together and bound round with fine braid prepared from the same hair. Curiously enough, the only other specimen of hair in the same case is also bound round with fine hair braid and is dark brown in colour."

Compare the description of the brown-haired detached mummy-head found at Chocota Bay, of which Wilson (1862) wrote: "It has been neatly braided, and several of the plaited braids are passed across the forehead, for which purpose they have been lengthened by the addition of false hair, so ingeniously joined as nearly to escape detection."

This custom of fastening additional human hair to a person's own is in itself worthy of comment. In Captain Cook's journal (1784, Vol. II, p. 231) from the discovery of the Hawaiian Islands, we read about the local native hair: "Instances of wearing it, in a singular manner, were sometimes met with among the men, who twist it into a number of separate parcels, like the tails of a wig, each about the thickness of a finger; though the greatest part of these, which are so long that they reach far down the back, we observed, were artificially fixed upon the head, over their own hair."

Among the islanders of the Society Group, we learn (Turbott 1947, p. 153) that: "Cords of finely braided human hair were bound round and round the head to form a turban." The same author, in his paper on "Hair Cordage in Oceania", shows (*Ibid.*, pp. 151, 155) that plaited or rolled cordage of human hair was common throughout Polynesia, was used in parts of Micronesia, but in Melanesia only in distinctly Polynesian colonies. He concludes that the distribution of human hair cordage throughout Polynesia and Polynesian colonies "would suggest that its use was a feature of the early culture shared by the Polynesians before their dispersal from a common home." It is therefore interesting to note the frequent archaeological discoveries of human hair cordage in Peru, several specimens of which are preserved among the hair-samples in Museo Nacional of Lima.

A false red wig (Izikowitz 1932), as well as a few attempts to cover black hair with red paint (Wilson 1862; etc.), have been recorded from Peruvian graves, and the Chibcha-inspired Colorados of Equador made their hair artificially red by plastering it with the waxy paste of the *urucu* (achiote). This reminds us of the similar attempts, widespread in Polynesia, to imitate the venerated and naturally red *uru-kehu* hair by artificial applications. (See page 198 above.)[1]

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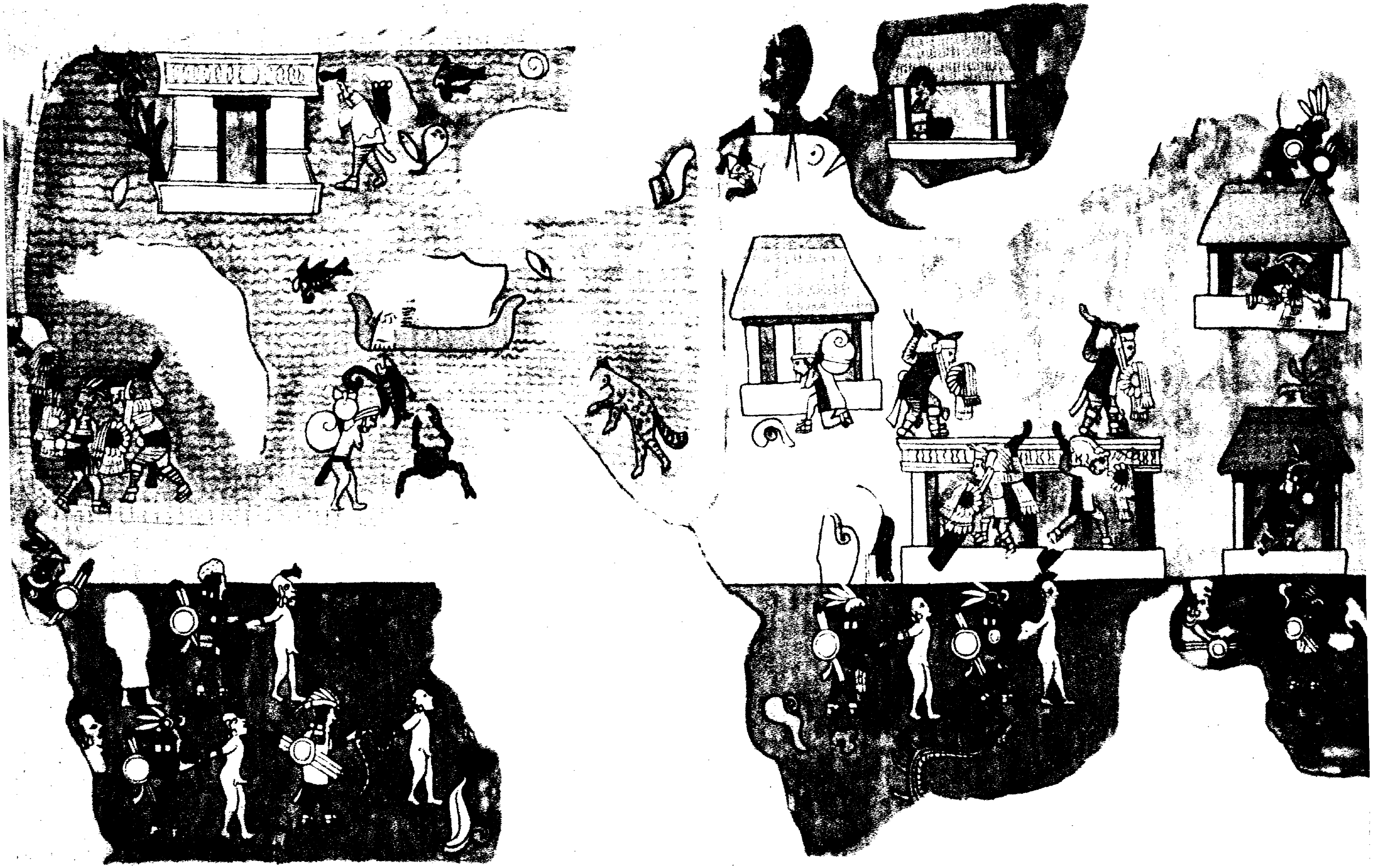
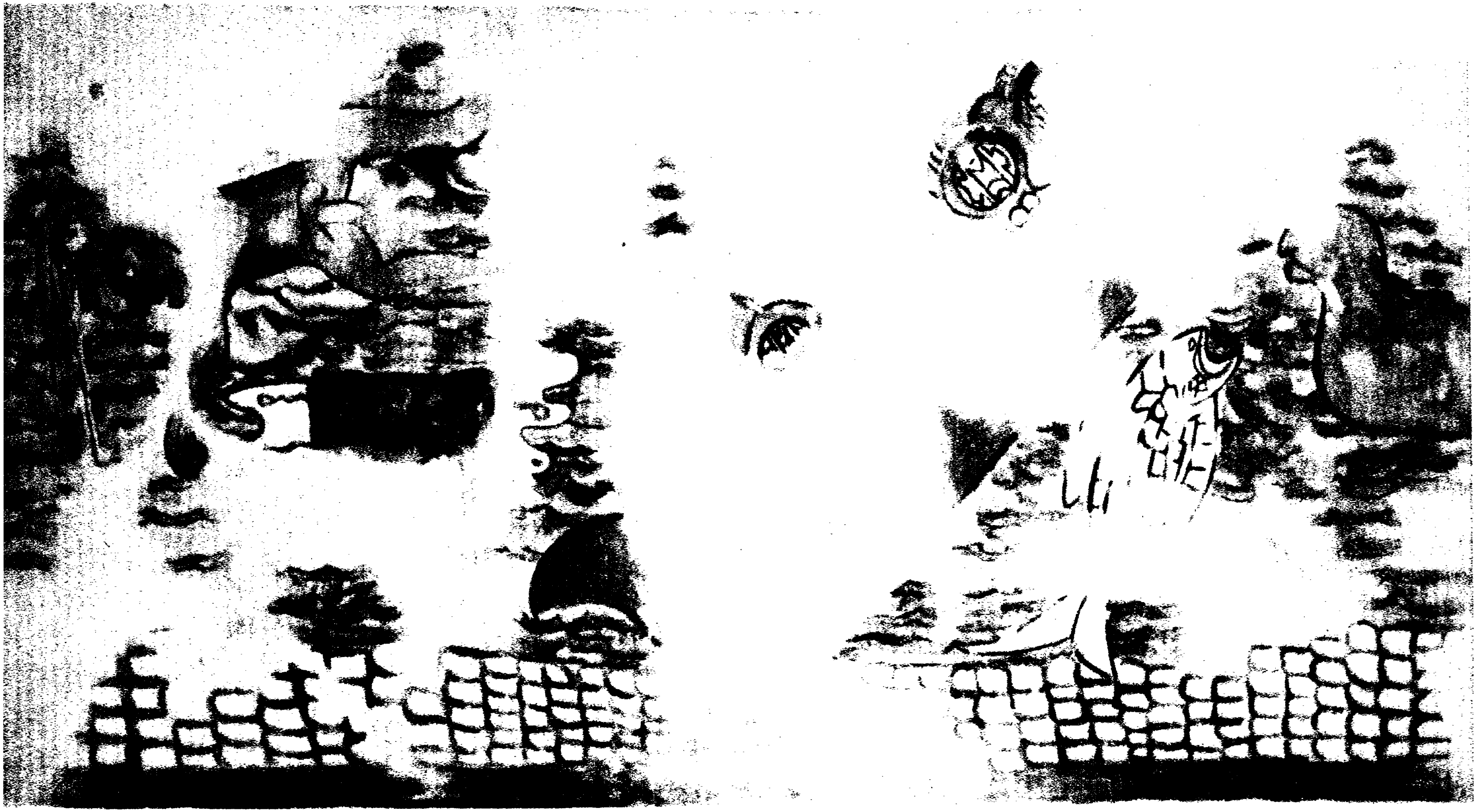
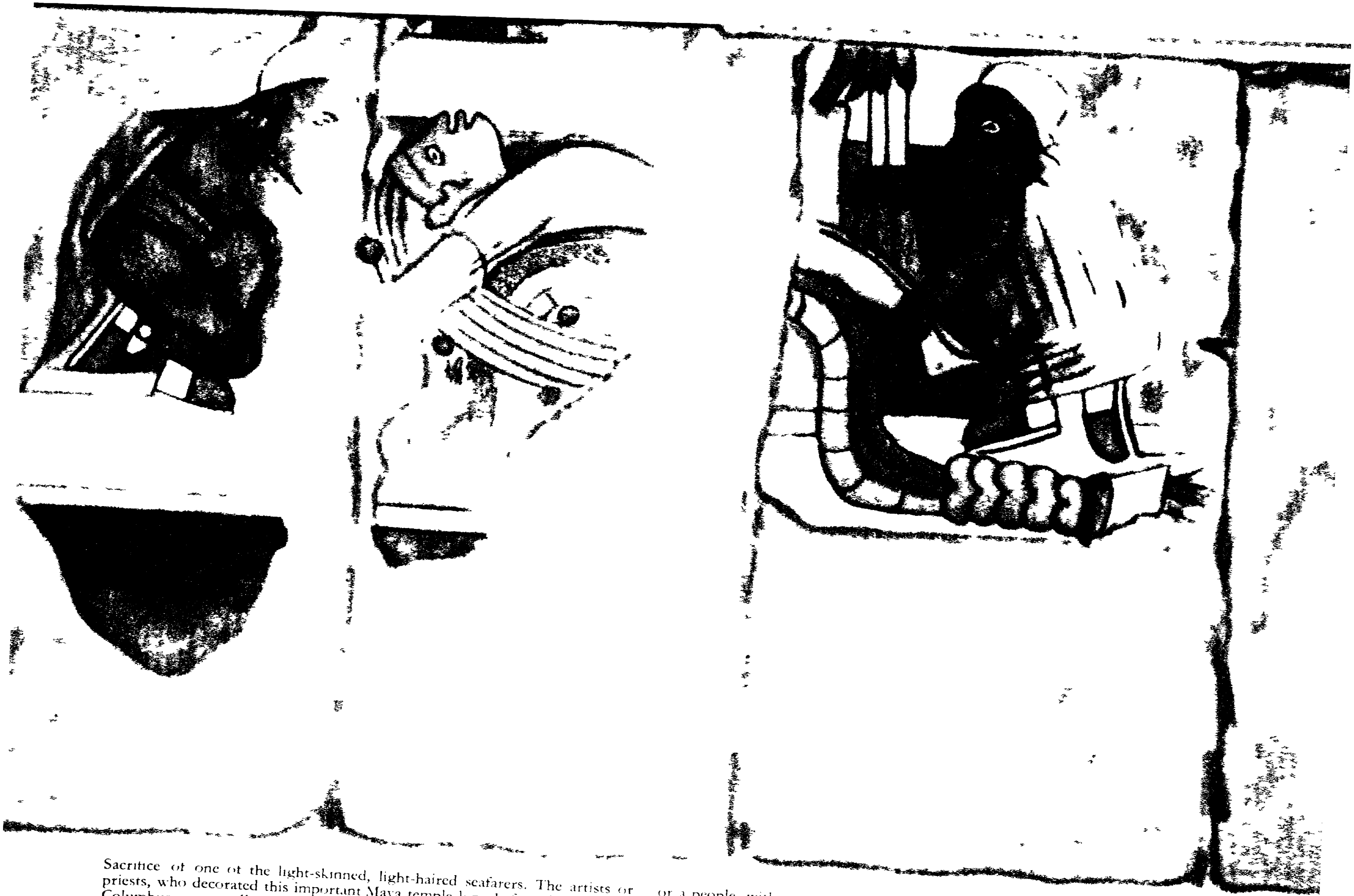
[1] Hagen (1939, pp. 19, 23-25) shows that the hair of the Colorado Indians in its natural state is black and coarse, but among the males it is almost always plastered red with the waxy red paste of the achiote: "To extract the color, the Indian places a good quantity of the seeds in his hand, expectorates upon them or wets them with a little water, and rubs his hands together, as one might make suds with soap. He then throws aside the seeds and applies the color to his hair, an act constantly repeated until it and the scalp are thickly covered with the red paste." He shows that: "The female does not dye the hair, but is content, on festive occasions, to rub a bit of achiote paste on the crown of the head only." Further: "The symbolism of this singular custom is most difficult to determine." He says of the achiote: "The French call it roucou, derived from the word urucu used by tribes of the Guianas."



Mural paintings from Temple of the Warriors, Chitzen Itza, Yucatan. The light-coloured men in the bay are apparently packing up to retreat by sea, while others to the right defend a village, or are taken away as prisoners in the procession of victors and captives on the road below. (From *Morris, Charlot, & Morris 1931*, through courtesy of *Carnegie Institution of Washington.*)

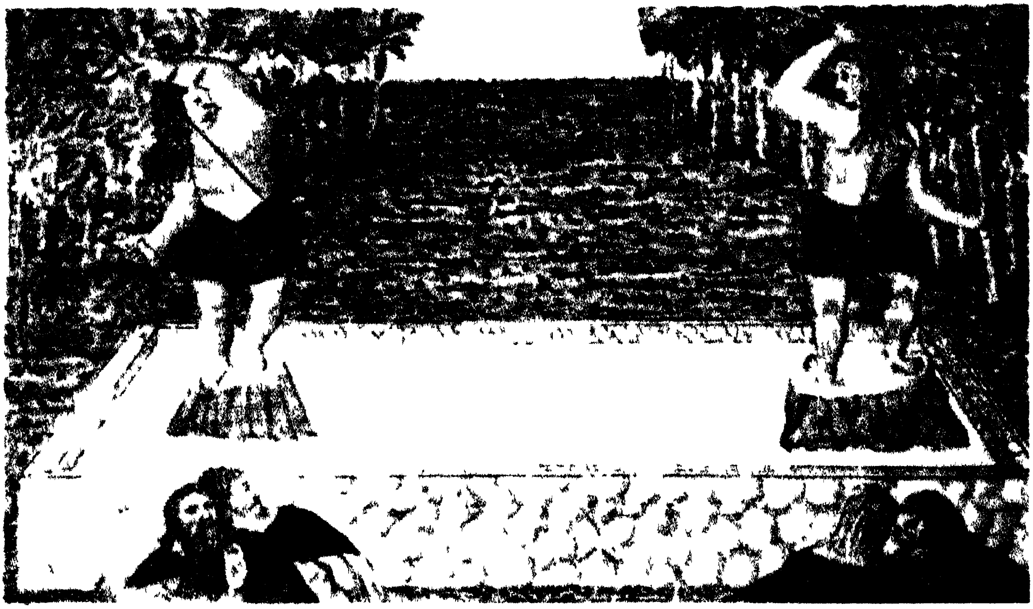


Yellow-haired navigator plunging from his craft to the fishes of the sea. Another detail from the same old Maya wallpaintings in the temple at Chitzen Itza. Morris, Charlot, and Morris (*1931, Vol. II, Pl. 146*) who first published the colour reproduction of these pre-Columbian murals, wrote in the caption that they "depict a series of relating episodes concerning a fair-skinned people with flowing yellow hair, defeated in battle and subsequently sacrificed by conventionally equipped black-skinned warriors. The unusual characteristics of the former group, a member of which is here represented in seeking escape by swimming, gives rise to much interesting speculation as to their identity."



Sacrifice of one of the light-skinned, light-haired seafarers. The artists or priests, who decorated this important Maya temple long before the arrival of Columbus, were well acquainted with the fact that there existed individuals, or a people, with race traits different from their own. The problem is: Who were they? (From *Morris, Charlot, & Morris 1931.*)

Additional fragments of the marine battle depicted in the Chitzen Itza murals. (*Ibid.*)



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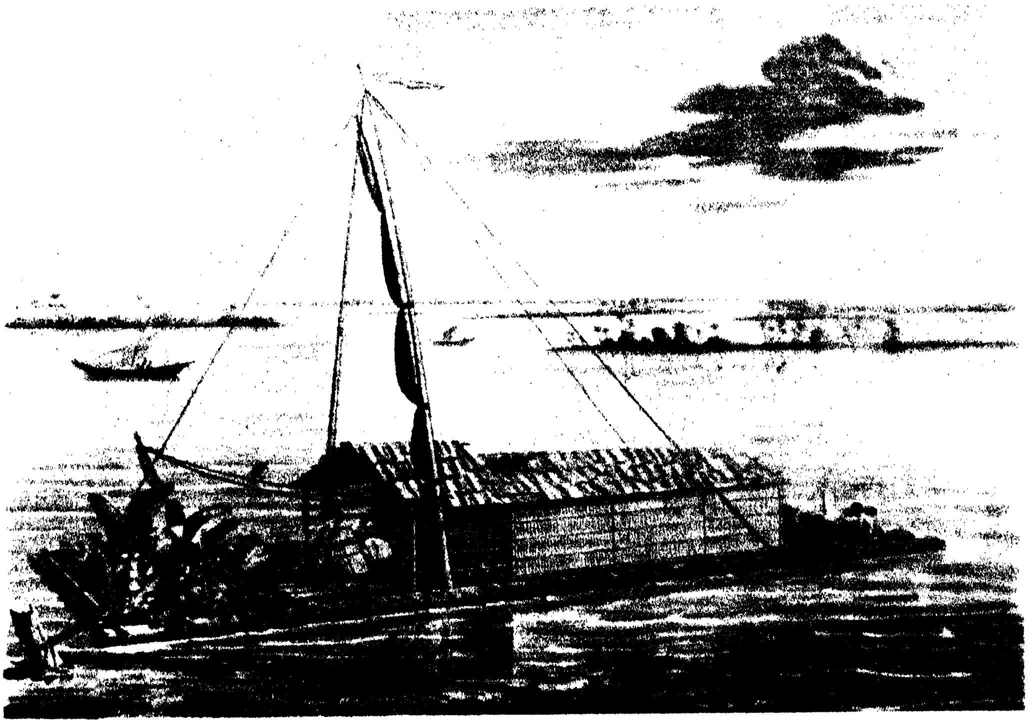

1 Two young men in a staged fight at Gran Canaria. Watercolours in Torriani's original manuscript from 1590. (From *Wölfel 1940.*) We do not argue a connection with Yucatan. Nevertheless, we must not forget that if the craft of this yellow-haired stone-age people could take them from Africa to the Canary Islands, then it could also send some on in the Canaries Current to Middle America.

2 Balsa raft in Guayaquil Bay; the original craft of Pacific South America. Note storage of fruits and nuts in bow and hut, and cooking place near centre-board in stern. (From *Humboldt 1810.*)

Mummy-bundle from Paracas, coastal Peru. The wrappings, which are more than two thousand years old, have been opened to expose the mummy-head wearing twig with long braids of blond human hair. (Photo: *Museo Nacional de Antropologia y Arqueologia, Lima.*)

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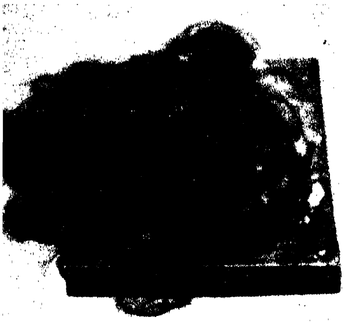
1 Specimen of European-like hair on pre-Inca head from Makat Tampu, near Lima, Peru. Note the fine texture, wavyness, and light colour of the hair. **2** Samples of human hair from some of the bearers of the pre-Inca high-culture at Nazca, coastal South Peru. (Photo: *Museo Nacional de Antropologia y Arqueologia, Lima.*)



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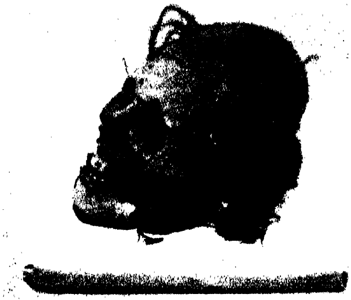

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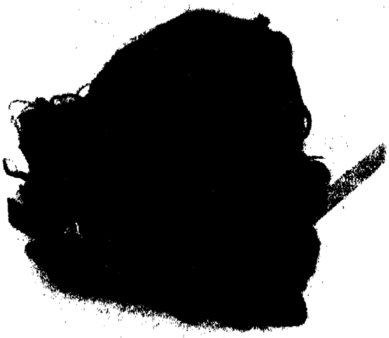

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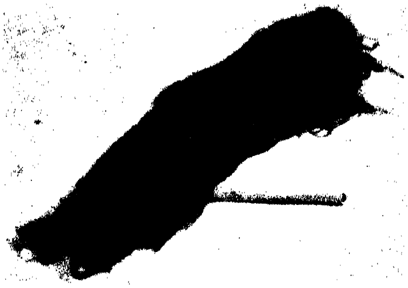

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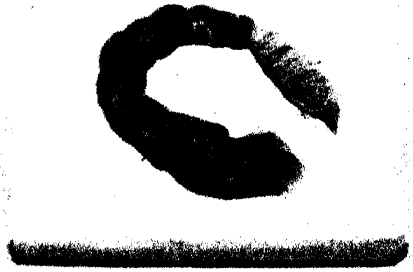

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Hair colour and texture of some of the bearers of the extinct pre-Inca high-cultures in Peru. **1, 5, 7, 9** from Makat Tampu, near Lima; **3, 6, 8, 10, 12** from Paracas Peninsula; **2, 4, 11** from Nazca. (Photos: *Museo Nacional de Antropologia y Arqueologia, Lima.*)

Tall stature, narrow face, and non-Mongoloid hair on Paracas mummies

Nowhere in Peru has a really large group of pre-Inca mummies been preserved for posterity under better conditions than those of the Paracas burial caverns and stone-lined tombs on the Pacific coast. Stewart (1943, p. 49) says: "One of the most important developments in Peruvian archeology was the discovery in 1925 by Tello and Lothrop of two sites on the Paracas Peninsula, 18 km. south of Pisco, representing one of the earliest coastal cultures." Here several hundred carefully wrapped mummies were revealed, a small series of which have been systematically examined. Kroeber tentatively places these remains within the Early Nazca period, Tello holds that they even antedate this time and are contemporary with Early Chavín, and the Carbon 14 method suggests that they date from about 300 B. C., plus or minus 200 years. There is accordingly no doubt about their great age and pre-Inca origin.

Examining the blood groups in the tissues of some of these mummies, Candela (1943, p. 65) failed to get the normal reactions of naturally dried and untreated mummies. He suggested that one reason was "the presence in most of the tissues of some gummy, resinous material, serving perhaps as a preservative. This substance was particularly evident in the extracts produced by means of boiling water, and it rendered the performance of the tests by this method almost impossible."

Examining the Paracas skeletal remains, Stewart (1943, p. 59) found that these mummified individuals were of a noticeably taller stature than formerly known Indians in Peru, and that they differ from known Indians also in facial form. Both cranial deformation and trepanning were observed. Stewart's own conclusion was: "It appears hence that the Paracas group differs from the Peruvian skeletal remains thus far studied, particularly in general size and in narrowness of the facial features. As I have pointed out, however, this may be a selected group of large males and not typical of the population as a whole."

The author also suggests that the narrowness of the facial features may perhaps be explained as a secondary alteration following an artificial deformation of the skull.

If there was any way of ascertaining that all people in pre-Inca Peru were the same as those of Inca times, then these explanations would undoubtly be the only logical ones, as a narrow face could then only occur through artificial pressure in infancy and an exceptional tallness only by a selection of unusual men for mummification. But until an historically homogeneous race behind the Inca and pre-Inca Empires has been proved to have existed, there is still the possibility that the early people in question were embalmed not because of their size, but because of their rank or race.

The hair on some of these Paracas mummies was also thoroughly analysed. Trotter (1943, p. 69) based the interesting hair analysis on pieces of scalp from ten Paracas mummies of which two were females, and of which one male and one female had in advance been classified as 'young'. She says: "... there was some evidence that the others were old, since the sample in each case was interspersed with very light yellow hairs which may be assumed to have been white. In general, the color was a rusty brown and gave the appearance of having faded. These hairs fluoresced, the lightish or yellowish ones more brilliantly than the darker hairs. In all cases the hairs were extremely brittle and had to be handled with greatest care." Further (p. 70): "The hair of mummies 94 and 310 was quite definitely wavy; that of the others appeared to be straight."

Trotter does not attempt to give any explanation of this latter interesting statement that two out of ten scalps examined had plainly wavy hair.

Neither does she imply that the rusty-brown hair-colour showed evidence of having faded from the normal blue-black Indian hair, as will be seen from the following. It would also seem difficult to visualize that the rusty hair had brightened from an original black if the light yellow hair on the same heads have darkened from white. One should expect that the hair colour of these mummies either has assumed a generally darker or a generally lighter hue. If *post mortem* change of pigment has taken place on these particular Paracas mummies, as opposed to others in Peru and those in North Africa, then the combination of both rusty brown and very light yellow hair on the same heads would seem to argue that the original scalp either had been black interspersed with rusty brown hairs, or else yellow-blond interspersed with white hairs. The third possibility seems to be that the scalps in question have retained their original shades comparatively unmodified, like the mummy cloth. Let it also be borne in mind that we have previously dealt with a Peruvian mummy head that was described as brown and slightly grey. The mummy scalps now under discussion were also brown, but interspersed with light yellow.

Apart from colour and degree of waviness of hair, its fineness and also the shape of its cross section are, as is well known, the two additional characteristics used for classifying hair types. Mongoloid hair, like that of the common American Indian, is wide in cross section *area* and circular in cross section *form*. The degree of ovalness in cross section form seems closely associated with the degree of waviness or curliness of the hair itself.

Trotter (*Ibid.*, p. 72) says about the microscopically analysed form of the Paracas mummy-hair, after classifying it in accordance with Martin's grading system: "The cross section form shows so much divergency between the different mummies that they cover all divisions of hair form..." And: "It has been assumed that these mummies are all from one racial stock, therefore this analysis must necessarily be one of individual variation from an intraracial standpoint."

As to the *size* of the cross section *area*, she found (*Ibid.*, p. 75) that: "The size of the hair was much smaller than has been found for other Indians, but not so small as has been recorded for at least one white racial group [the Dutch]."

The author stressed in her summary that: "The form and size of the hair of ten Paracas mummies showed wide variation." She showed that although some of the hair samples were wide, yet the average from all ten mummies was "approximately 30 % less than the average mean areas found for the four Indian tribes by Steggerda and Seibert and for the adult French Canadians by Trotter and Dawson."

Unguided by any working hypothesis Trotter presents her important analysis of the Paracas mummy hair as a series of remarkable somatological data from early coastal Peru. On the assumption that the current anthropological view is correct, that no intrusive or mixed race element was present in Peru before the arrival of the Spaniards, Trotter was led to speak of the necessety of "individual variation from an intraracial standpoint", while suggesting that the unusual Caucasoid fineness of the hair might possibly have been due to changes during the process of mummification. On my asking whether or not there was any actual reason to believe that the fine, brownish, and occasionally wavy Paracas mummy hair had changed greatly post mortem, having been coarse and black like normal Indian hair on the live natives, Dr. Trotter (1951)[1] wrote me as follows with reference to her paper quoted above: "I have gone over all the evidence we have and have discussed it with Mr. O. H. Duggins, who is now working with me on the subject of hair. His background is an interesting one, since he has worked in the hair and fiber section of the F. B. I. I have come to the conclusion that there are two mistakes in my paper on the mummies' hair. The first mistake was to introduce the word 'Indian', and the second was the use of the word 'faded'. Now I shall try to answer your direct question with a direct answer. The hair of the Paracas mummies which I examined in 1943 may have changed color and texture slightly. However, the amount of change in either color or texture from any evidence we have would not deny that the original color was a reddish brown and that the original texture was fine." Although no reason was found to warrant the hypothesis that the reddish-brown scalps had ever 'faded' from blue-black, microscopic examination showed that the light yellow hairs, interspersed to a very slight extent in eight of the samples, contained no pigment, and hence presumably had been even lighter, or white.

Trotter further writes that the cross-section area of hair is closely correlated with its weight, and that hair of Arabs of Central Iraq was tested for change in weight before and after dehydration. After 16 hours of dehydration the alteration of weight ended, and no further change took place afterwards. The hair had then lost between 4 and 5 per cent of its weight. Trotter (*Ibid.*) writes: "Since this Arab hair lost its weight during the first 16 hours of dehydration it is unlikely that shrinkage of mummy hair (if it does occur) could greatly exceed 5 per cent of the volume." This is interesting, since she found, as we have earlier seen, that although some of the Paracas hair samples were wide, yet the average from all the mummies examined was approximately 30 % less than on normal Indian hair. Evidently then, Trotter is right in being cautious in the use of the word 'Indian' with reference to the Paracas mummies, provided the term 'Indian' may not be used in its widest sense to denominate any racial type inhabiting the Americas before the arrival of Columbus.

Before I was kindly furnished with this interesting information by Trotter, the British Museum had suggested W. R. Dawson as a leading British authority to consult on the question of possible change in mummy hair. Dawson (1928, p. 127) who is earlier quoted as examining on the Pacific coast of North Chile an embalmed adult women with "abundant light-brown hair", was kind enough to send me his opinion as follows[2]:

"From the examination of a large number of mummies both from Egypt and other countries including South America, my opinion is that hair does not undergo any marked change post-mortem. The hair of a wavy or curly individual remains curly or wavy, and that of a straight-haired person remains straight. In mummies and desiccated bodies the hair has a tendency to be crisp and brittle, but this is the natural result of the drying-up of the selacecres glands, which during life, feed fatty matter into the hairfollicles which keeps the hair supple and flexible. ... it seems to me very unlikely that any change in colour would take place in a body which had never been exposed to the light, ... To sum up then, all the evidence I have indicates that the nature of hair does not alter after death except in becoming dry and brittle."

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[1] M. Trotter, Professor of Gross Anatomy, Washington University School of Medicine, letter dated June 22, 1951.

[2] Letter dated May 21, 1951.

There is accordingly every reason to give full attention to the non-Mongoloid characteristics of the somatological remains at Paracas. Obviously the high percentage of reddish brown hair on these embalmed culture bearers does not represent a cross-section of the population in Peru as a whole during these early periods. We may well assume that the common Indian was not mummified, the process at least of true embalming would in all likelihood be restricted to the upper social classes of such peoples as knew the process of artificial mummification. It is therefore especially interesting to note the high ratio of brown hair among the black on the early people who evolved—or imported—the high-cultures of Peru.

The position may be briefly summarised thus: An analysis is made of a group of well-preserved mummies from the central coast of Peru for the specific purpose of gaining all possible information about the physical appearance of the unknown bearers of a lost pre-Inca high-culture. If their stature, cranial and facial indices, and hair had been found to concur with the physical data already known as characteristic of the region, then the observed data would probably have been used as an argument for homogeneity of race, without considering the possibility that the extinct race may have looked entirely different from what their own remains suggested.

As it is, however, neither stature, cranial and facial indices, nor hair, have been found to concur with the familiar norm of local Indians, and it has therefore been suggested that these mummies in every way misrepresent the physical type of their own unknown race. Divergency in head form is readily accounted for through more or less distinguishable modification in early childhood, a practice which admittedly occurred; and a difference in face type is explained as possibly a secondary result of the former deformation, a hypothesis of less apparent strength, as this should give a narrow face-form to any Peruvian whose head was correspondingly deformed. When the hair is brown it is suspected as having been formerly black, and when exceptionally fine it may have shrunk. When wavy and including all extremes of hair-form, it may be unusual variations from the mean tribal norm. The skeleton, which cannot have *increased* through deformation in infancy or mummification, can still give us a wrong impression of the bodily build, if we assume that only the largest men of the community were specially selected for mummification.

Separately considered, each of these excuses for the unexpected nature of the Paracas mummies may carry some weight, but as a whole they merely work against each other. It would be too fantastic to assume that all the main physical traits of the mummies analysed should in one way or another misrepresent the mummified race, both through childhood deformation, *post mortem* shrivelling and fading, individual divergency and intentionally selective burials. If this be so, nothing has been learnt from the discovery of the Paracas mummies as such, everything pertaining to their physical appearance may be misleading, and for those who wanted to know what these early people were like, nothing is gained by seeing them. On the other hand, while drawing no exaggerated conclusions, it can safely be said that nothing discovered in the Paracas caves argues against the hypothesis that a foreign Caucasian-like race entered into the culture complex of pre-Inca Peru, and that this race was comparatively tall in stature, with a narrow face, and hair in varying shades of brown, fine in texture and occasionally wavy. We can only say that we have found what we were looking for also among the physical remains of prehistoric Peru. They confirm what was indicated by the Inca memories and the pre-Inca pottery heads: that a non-Mongoloid and Caucasian-like element seems to have been present in the early local era. The burden of proof, and of finding a plausible explanation, here rests upon those who maintain that nothing but Mongoloid traits have been observed in available human material from pre-Inca Peru.

Historic evidence

In his popular survey of aboriginal culture in prehistoric America, Verrill (1927; 1929) brings up for a stimulating discussion some of the elementary questions pertaining to the rise and spread of the local high-cultures. Pointing out the coherent geographical pattern of old civilizations in the New World, he stresses (1929) the improbability of this inter-tropical distribution-area being the result of numerous sudden and independent flowerings of culture in these often unfavourable desert and jungle areas. He points to the generally noted absence of any local culture-growth or cultural experimentation underlying the respective cult sites, such as Coclé, San Augustin, Tiahuanaco etc., and to the fact that each distinct culture area shows the widest variation from the others in detail and character, although the basic ideas were the same and were consistently common to them all. This leads him to the logical deduction that migrants from some of the local civilizations may perhaps have been active among the aboriginal population in all these localities, spreading the basic principles of their own religious beliefs and cultural doings into foreign and more primitive culture domains. The resultant high-cultures may thus in each case represent a blending of the local primitive culture and the intruding civilization, the primitive elements being perhaps largely responsible for the final destruction of the civilization and the abandonment of its original cult site.

As an argument against the much disputed hypothesis of a racial homogeneity in aboriginal America, the same author (1927, p. 45) writes :

"Although the majority of North American Indians have brown eyes and coarse, straight, black hair, there are tribes whose eyes are hazel, grey, or even blue, and whose hair is brown rather than black, and is soft and fine. Indeed, if we read over all the accounts of the old discoverers and explorers we will find that, even in those days, the men who had actually travelled among the Indians had accurately described these variations. Dampire, the pirate naturalist, Ringrose, Esquemeling, and many others called particular attention to the light skins and brown hair of many tribes and, in several places in their journals, they state that the women are 'as fair as any woman of Spain', or that their hair 'is exceedingly long and soft and of pleasing brown shade'. This proves that the light skins, brown hair, and grey eyes of some Indian tribes are not due to any admixture of Caucasian blood."

Whatever may be the origin of these Caucasian-like features, they had at least found their way to early America, or had developed locally, before the Spaniards arrived. Already by 1502 or 1504, Angelo Trevisan's letter to the King and Queen of Spain was published, describing the men of a certain Arawak tribe as "of light colour, with long hair and beards".[1]

As far as the Inca territory is concerned, it may be interesting to notice a reference made by Pedro Pizarro (1571, p. 380) who himself took part in the conquest of Peru. He distinguishes between the lords and ladies of the land (the Inca long-ears) and the 'common and lowly' population who were their subjects: "Among the Ladies there were some tall ones, not among the daughters of the Kings, but among (those of) the orejones, their kinsmen. ... They considered themselves beautiful, and almost all the daughters of these Lords and orejones were so. The Indian women of the Guancas, Chachapoyas and Cañares were the common women, but most of them beautiful. The rest of the womanhood of this kingdom were plump, neither beautiful nor ugly, but of average appearance. The people of this kingdom of Peru were white but of a tawny hue, and among them the Lords and Ladies were whiter than Spaniards. I saw in this land an Indian woman and a child who did not differ from those who are white and blond. These people say that the latter were the children of the heathen gods."

Pizarro saw the aboriginal Peruvian nation before the fair-skinned local society was absorbed by the Spanish settlers, and before a casual light and blond Peruvian could be suspected of post-Columbian impurity of blood. Obviously, it was the particular minority of the Inca nation consisting of the upper aristocracy and the superior physical and intellectual types (judged by European taste and standards) which after the conquest quickly became absorbed by and lost among the Castillian colonists. The local Indian population of Peru to-day are only the descendants of the lower classes and of less attractive mental and physical types among the masses once ruled by the Cuzco Incas. They give a thoroughly misleading conception of the former Inca aristocracy, their physical and mental bearing and quality, their culture and knowledge.

As Verrill (1929, p. 21) again expressed it:

"... the Mayas, the Aztecs and the Incans were not homogenous races of one blood. In all cases they were the result of conquest and confederation of many races and tribes by an intellectually superior people. No doubt these superior people, who formed the ruling classes,—the priests, etc.—were of a distinct type from the bulk of the population. ... The Incas themselves were, we know from the records of the Spaniards, a much lighter-colored lot than their subjects, and possessed almost Caucasian features. Portraits made from life soon after and even during the conquest prove this, and the same is true of the aristocracy of the Aztecs."

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[1] Radin (1942, p. 7) writes: "The Trevisan letter thus contains the earliest description of the natives of South America and merits full quotation: 'The men, of light color, with long hair and beards, are of fine stature, gentle, and show a desire for new things, and this was indicated by signs. And they indicate with the hand that the interior of the country was very populous and had various peoples; for when we asked them about both the chair and the utensils, they managed to indicate by signs with the hand that people came from inside the country and took shells of the pearls—or rather, of the containers (i. e. oysters) and pearls—for their garments. (Those natives) had also some clothes of cotton.' " Lothrop (1942, p. 258) writes concerning the high-culture centre of Coclé in Panama: "...we should point out that the population of Coclé may well have been of multiple origin. At the beginning of the sixteenth century, Spanish accounts make clear, there was great diversity of speech and physical type. This is exemplified by the giant bearded warriors of Escoria, by the frequent need of interpreters between one village and the next." He also writes concerning the tribes in this same neighbourhood (1937, p. 13): "We have already quoted (p. 10) a passage from Andagoya concerning the very tall warriors of Escoria. The existence of these is confirmed by Espinosa who remarks that two brothers of the chief were 'so large and strong that they seemed giants; and one of them as bearded as the most bearded Christian could be.' Certain skeletons at the Sitio Conte measured over 178 centimeters (5 feet, 10 inches) in the ground although not in a fully extended position and certain individuals must have stood well over 6 feet in life. Less definite evidence of physical variation comes from López de Gomara who states that most of the natives varied in color between yellow and 'lion' but some were as black as the inhabitants of Guinea. The same writer also mentions very tall people."

The noted Inca historian, Markham (1911, p. 121), has also stressed this physical distinction: "We see the Incas in the pictures at the church of Santa Ana at Cuzco. The colour of the skin was many shades lighter than that of the down-trodden descendants of their subjects; the forehead high, the nose slightly aquiline, the chin and mouth firm, the whole face majestic, refined, and intellectual."

We have also seen that one of the ruling Incas received the name Viracocha because he found himself able to grow a beard. Inca Viracocha's sister-wife was called Mama-Runtu, meaning "Mother Egg". This was, says Inca Garcilasso, because of her fair complexion, as she was supposed to be "white as an egg".

Those who doubt that beards grew in aboriginal Peru have overlooked the fact that when the Spaniards arrived the Inca nation already possessed their own word for a "bearded man": *Soñkhasapa.* (Ondegardo 1940, p. 154.) Although anything but light-skinned, the primitive and isolated Sirionos of Inca-occupied Bolivia had also great bushy beards, besides slightly wavy, fine hair.

We have seen how the Inca dynasty claimed divine and solar descent through inheritance from their leading culture-hero Viracocha; also how Titicaca Island tradition described the Incas as the offspring of native women and a subsequently expelled race of white men. These native beliefs should be judged alongside the early European paintings of the Incas at Cuzco, as well as Pizarro's already quoted statement that among the Inca nobles "there were some who were whiter than the Spaniards". Pizarro's statement, also, that white and blond individuals were locally considered to be "the children of the heathen gods" has specific significance when we recall that it was Viracocha who was the "heathen god" confronted by the Spanish missionaries in Peru.

Since the blond woman and child met by Pizarro in early Inca Peru were locally considered to be "the children of the gods", we may recall how the same expression was used in Polynesia, where blond or *uru-kehu* individuals among the native stock were called "the golden-haired children of Tangaroa". We have earlier seen how Tangaroa, in the Society Group, was stated to be but another name for the first Polynesian monarch Tiki (Ti'i), which again take us back to the original name for Viracocha, the "heathen god" of Peru. We also recall how fair-haired children were held in high esteem in Polynesia, such hair being regarded in New Zealand as a sign of high chieftainship. On the Titicaca plateau, even to-day, we learn from La Barre (1948, p. 217) that among the Aymara Indians: "Children or babies with white hair (albinos) are called *Tatitum Munata*, or 'beloved of the Lord'."

It is interesting to note that the earliest Spanish explorers recorded an exceptional whiteness of the skin, and occasionally light hair, among Peruvians who had never before seen Europeans. For it is obvious that such natives, if met a generation later, or in our day, would be overlooked as of mixed European descent, whereas we should look to the common bulk of the more primitive-looking population for genuine representatives of pre-Spanish South America. The evident impossibility of distinguishing pre-European from post-European elements with regard to Caucasian-like individuals among the Peruvian Indians of to-day makes a search for pre-Inca hereditary traits among the present population even more futile. Thus a survey of Titicaca Island physical types to-day may perhaps to some extent indicate a complex background, but nothing more. Bandelier (1910, p. 67) wrote from the island: "Among the men there are some tall and well formed figures, with pleasant faces; many are of low stature and have sinister countenances." There is still an individual variation in skin colour among aboriginal Peruvian Indians, but only when a marked distinction is found to set aside a tribe rather than an individual, the possibility of European infiltration is somewhat reduced. Thus, when a whole Peruvian highland tribe, like the Chachapoya, are noted for what is described as an "unusually light skin" (Rowe 1946, p. 187), the persistence of a hereditary characteristic from early times is certainly suggested.[1]

Although as a general rule brown hair seems to have vanished from aboriginal Peru with the era of the culture-yielding predescessors of the present Quechua and Aymara-speaking population, brown hair has sporadically appeared—as in the *uru-kehu* strains of Polynesia—among other sporadic South American tribes until our days. In his paper on "The pigmentation and hair of South American Indians", Steggerda (1950, p. 85) first shows the great instability of skin colour among the aborigines of this territory, varying from those who have "a very light skin color, almost white" to those whose colour is "a coppery or even purple-brown". He then goes on to say (*Ibid.*, p. 89):

"In describing the hair of Indians in both North and South America, anthropologists very frequently use the general adjectives: 'coarse', 'black', and 'straight'. Many tribes, however, do differ from this description; and those comments of anthropologists that deviate significantly are recorded below. According to Harris (1926), who has made a thorough study of the brown and white Indians of San Blas, the hair is black in brown Indians, and from flaxen to straw-colored in the white Indians. ... Skottsberg (1913) describes the hair of the *Alacaluf* as brown, in contrast to the uniformly black hair of the Fuegians. [Their eyes are dark blue in children]... In the *Guayakí*, the hair varies from brown to shiny black (Vellard 1934). Serrano (1930) has made an interesting observation on the *Mataco* and *Chorotí*; the hair of adults is black, while in the children it is reddish. ... Roquette-Pinto (1938) comments on the hard, straight hair of the *Nambicuara*, but mentions that he has seen a few of these Indians with wavy hair. The *Puinave*, an independent group in Colombia, is worthy of special comment; Pericot y García (1936) quotes a remark taken from Tastevin, in which the hair color of these Indians is described as chestnut brown to almost blond. Pericot y García (1936), however, states that their hair is black and straight... The *Bacaïri* hair color, though apparently black, shows a brown hue in strong sunlight, and the children always have this shade of hair. ... Wavy and frizzly hair has also been seen among certain individuals of the *Arawak* tribes; according to Pericot y García (1936), the incidence of wavy and frizzly hair is rather great. Among the Indians whose hair sometimes diverges from the norm are also the *Botocudo*. There is a frequency of reddish-brown hair in this tribe (Manizer 1919). Stegelmann (1903) also discovered a tribe of peculiar appearance living on the upper Envira River in Brazil. Their hair was light red, similar to that found in certain Jewish types. Their skin was red also. The other Indian tribes called them '*Coto*', which means 'howling monkey', because of the similarity of their color to that of this particular monkey."

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[1] We have just seen that the Chachapoya were one of the particular tribes specified already by Pizarro for the beauty of their women.

Psychological reactions to European arrivals

National traditions of a period when people of an other race had lived among them as rulers and culture-bearers would naturally produce a visible reaction in any country if alien newcomers arrived with a physical appearance similar to that of the departed heroes. As is well known, it was just such reactions that, in different circumstances, led to the easy conquest of Mexico and Peru, as well as to the tragic death of the famous Pacific explorer Captain Cook.

When Juan de Grijalva led his expedition from Cuba to Cozumel Island in 1518, and thence passed over to the Yucatan peninsula to explore the coast of the Mayas, and likewise when Hernando Cortes in the following year landed in the old wake of Quetzalcoatl on the Aztec coast of Vera Cruz to begin his famous conquest of Mexico, the Spaniards were amazed to find that vastly superior native armies remained quiescent instead of attacking or resisting the small invading party of Europeans.

This circumstance had the greatest historic consequences for the opening up of the New World to our own race. The sole reason for the failure of the Aztec emperor Montezuma to make use of his large fortresses and armies was the confusion in the native mind between the Spaniards and the white hierarchy which was the foundation of their own religion and history.

Brinton (1882, p. 138) shows with the early Mexican chronicler Tezozomoc[1] how the great Aztec monarch was confused: "... when his artists showed him pictures of the bearded Spaniards, and strings of glittering beads from Cortes, the emperor could doubt no longer, and exclaimed: 'Truly this is the Quetzalcoatl we expected, he who lived with us of old in Tula. Undoubtedly it is he, *Ce Acatl Inacuil*, the god of One Reed, who is journeying.' "

The dramatic history of Cortes tells how the belief that he was the returning Quetzalcoatl made the Aztecs sacrifice to him a human victim, with whose blood the conqueror and his companions were marked. When Cortes had his first interview with Montezuma, the latter addressed him through the interpreter Marina in very remarkable words that were recorded for posterity by Cortes himself in his *Carta Segunda*, (October 30th, 1520)[2]: "Having delivered me the presents, he [Montezuma] seated himself next to me and spoke as follows: 'We have known for a long time, by the writings handed down by our forefathers, that neither I nor any who inhabit this land are natives of it, but foreigners who came here from remote parts. We also know that we were led here by a ruler, whose subjects we all were, who returned to his country, and after a long time came here again and wished to take his people away. But they had married wives and built houses, and they would neither go with him nor recognize him as their king; therefore he went back. We have ever believed that those who were of his lineage would some time come and claim this land as his, and us as his vassals. From the direction whence you come, which is where the sun rises, and from what you tell me of this great lord who sent you, we believe and think it certain that he is our natural ruler, especially since you say that for a long time he has known about us. Therefore you may feel certain that we shall obey you, and shall respect you as holding the place of that great lord, and in all the land I rule you may give what orders you wish, and they shall be obeyed, and everything we have shall be put at your service. And since you are thus in your own heritage and your own house, take your ease and rest from the fatigue of the journey and the wars you have had on the way.' "[1]

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[1] *Cronica Mexicana*, Chap. 108.

[1] English translation by Brinton (1882, p. 139).

Brinton (*Ibid.*, p. 140) comments: "Such was the extraordinary address with which the Spaniard, with his handful of men, was received by the most powerful war chief of the American continent. It confessed complete submission, without a struggle. But it was the expression of a general sentiment. When the Spanish ships for the first time reached the Mexican shores the natives kissed their sides and hailed the white and bearded strangers from the east as gods, sons and brothers of Quetzalcoatl, come back from their celestial home to claim their own on earth and bring again the days of Paradise; a hope, dryly observes Father Mendieta, which the poor Indians soon gave up when they came to feel the acts of their visitors.[2]"

The Maya Empire and its civilization had already ceased to exist by the time the first Spaniards arrived, but the early beliefs and predictions were still alive among the people. As Brinton (*Ibid.*, p. 167) says, they were obscure, "but the one point that is clear in them is, that they distinctly referred to the arrival of white and bearded strangers from the East, who should control the land and alter the prevailing religion.[3] Even that portion of the Itzas who had separated from the rest of their nation at the time of the destruction of Mayapan (about 1440—50) and wandered off to the far south, to establish a powerful nation around Lake Peten, carried with them a forewarning that at the 'eight age' they should be subjected to a white race and have to embrace their religion;..."[4]

What passed in the more savage minds of the many Indians of Central America at the first sight of the white Spaniards may be difficult to judge, as nothing indeed happened among these smaller jungle tribes which could leave comparable traces in history. The Spaniards, rarely behaving as friendly "god-men", frequently stirred up trouble with primitive peoples on the Isthmus, but there is still ample evidence that their physical appearance could enable them, like any white and bearded men, to pass freely through the jungles as "supernaturals". Andagoya (1541—46, p. 25) gives the following instance, speaking of the original 'migration' of a small group of Spaniards from Nata to Paris, north of Panama: "The Indians had never seen Spaniards, and held such people to have fallen from the skies, and they would not attack them until they knew whether they would die."

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[1] The words of Montezuma are also given by Father Sahagun, *Historia de Nueva España*, Book 12, chap. 16. Montezuma referred to the prediction several times, according to Bernal Diaz, *Historia Verdadera de la Conquista de la Nueva España*, chap. 89, 90.

[2] *Historia Eclesiastica Indiana*, Book 2, chap. 10.

[3] "Nakuk Pech, *Concixta yetel mapa*, 1562, MS.; *El Libro de Chilan Balam de Mani*, 1595, MS. The former is a history of the Conquest written in Maya, by a native noble, who was an adult at the time that Mérida was founded (1542)." (*Ibid.*)

[4] Juan de Villagutierre Sotomayor, *Historia de la Provincia de el Itza*, passim (Madrid, 1701).

If we assume that these primitive but warlike tribes retained no national memory of former 'white' people who had passed and claimed personal sun-descent, this incident pertaining to Spanish migration is no less informative, since it then at least shows how readily local primitives at that time confused a foreign race of light colour with supernatural sky-people and so let them pass without injury. Only when this group of Spaniards, having received a gift from the savages amounting to "eleven *castellanos* of good gold", entirely lost their heads and wanted to seize the chief, did they involve themselves in hostilities and have to flee *in stolen native canoes*, following the coastline to the province of Comogre, at the southern extremity of the Panama Isthmus. These very same simple water-routes of migration or escape through Panama were open not only to the Spaniards, but also to any local *Quetzalcoatls* or *Kukulcans* of pre-historic times.

Just south of this narrow Isthmus, the treasure-seeking Spaniards entered the territory of the peaceful Chibcha of Colombia. The earliest traditions of this northern Andean people were also of the arrival and local ministrations of a white and long-bearded monarch so that the Spaniards were immediately taken for members of the same race. This hero was locally known under various names, among which were *Sua* and *Chiminigagua*, "and when the Spaniards first arrived they were supposed to be his envoys, and were called *sua* or *gagua*, just as from the memory of a similar myth in Peru they were addressed as Viracochas." (See p. 282 above.)

This brings us back to Peru and the Inca Empire, where also a handful of Spaniards conquered an empire by the effects of their appearance upon the local hierarchy. As the subject has already been dealt with we shall only give a brief summary of the Inca reactions to the coming of the Spaniards based on the early accounts of Garcilasso, Cieza, Sarmiento, Polo, and other chroniclers from early Peru. As man's physical capacity and his desires and inclinations can not have changed much between the days of the Old Maya and Early Chimu and those of Cortes and Pizarro, and as the size and conformation of the land, its coasts and jungles, mountains and valleys were the same in both periods, one may well suspect that what happened in the generation of Pizarro could have happened also in the long centuries and millennia when America was unknown to us.

When the Spaniards had established their first small colonies at Darien, on the Atlantic side of Panama, they soon marched across the narrow Isthmus to find, in 1513, a vast ocean on the other side. Exploring the sparsely inhabited coastline further south along the Isthmus and northern Colombia, they found a closed jungle wall reaching to the sea, and extensive stretches of mangrove-covered swamp-lands uninviting to treasure-seekers, clergymen and settlers alike. This caused them to push on rather quickly in small self-made sailing craft, closely following the coastline with its fresh-water outlets in search of more favourable regions. It is generally thought that Andagoya reached Colombia in 1522, doing part of his exploration in a native canoe, and Pizarro went a little further two years later. Returning from his first trip and setting out again, Pizarro passed on in 1527, with certain interruptions, straight to Tumbez in Peru, and from here the coast of the former Chimu Empire was explored right down to Santa near Chimbote.

Thus, only fourteen years after Balboa's discovery of the Pacific Ocean, and eight years after Cortes' landing in Mexico, other small groups of Spaniards had worked down the coast of Peru. Not satisfied with this journey, Pizarro went back to Panama, crossed the Isthmus and returned to Spain to inform his King about the new land, and to obtain a concession to conquer it. He came back, crossed the Isthmus with a little group of followers and was down in Tumbez for the second time by 1531. According to Sarmiento (1572, p. 186), on Pizarro's first visit to Peru, Inca Huayna Capac was the mighty ruler of the vast empire, which then comprised several of the present republics of western South America.[1] The same early authority claims that the emperor and his son Atahualpa then received the news that none less than Viracocha himself and his followers had arrived on the coast near Tumbez and had departed again. If this is correct, this incident had no doubt recalled to the emperor's mind the tradition that the departing Viracocha had promised to return; the news must therefore have strengthened his belief in this sacred culture-hero, who had been blindly worshipped as the principal deity of this empire for the many generations since he left their northern coast.

The concurrence of the Viracocha traditions with Pizarro's brief visit of 1527 seems to have awakened in the minds of the Peruvians a feeling that century-old warnings were about to be fulfilled and that the end of their empire was approaching, since Viracocha had suddenly returned, and was afloat somewhere nearby. Priests foresaw what would happen when Viracocha came back to take power, as is clearly shown in the following narration of Pedro Pizarro, who entered Peru with the Spanish conquerors in 1532, roughly five years after his cousin Francisco Pizarro had paid his first visit to the coast. Pizarro (1571 b, p. 470) wrote:

"Hear what I heard an orejon ['long-ear'] say, a Lord of this land. [He said] that five years, a little more or less, before we Spaniards entered this land an idol at Purima which these Indians had twelve leagues from Cuzco and to whome they spoke, had ordered all the Lords together, for he wished to speak to them. And when they were assembled, he said: You must know that bearded men are coming who are destined to overcome you. I have wished to tell you this that you may eat, drink and spend all you have so they may not find aught, nor you have anything to give them. As I say, an old orejon who had heard it told me this."

Thus, when Francisco Pizarro and his less than two hundred followers came back to Peru for the second time in 1532 to begin their march inland, they were by no means unexpected, but played an important part in the minds of the people. Pizarro and his two meagre boat-loads of companions did not come just to settle as *mitimas* in the midst of a powerful military empire, but simply to take it over. Inca Huayna Capac had died in the meantime, and his legitimate son Huascar had succeeded him as emperor of Peru. But he had left the kingdom of Quito in present Ecuador to his favourite son Atahualpa, whose mother was not of Inca blood, being a daughter of the conquered sovereign of Quito. Friction gradually arose between the two half-brothers, which was to end in a war between their large armies. Sarmiento (1572, p. 186) tells us how Atahualpa reacted when he heard for the second time of Pizarro's arrival at the coast:

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[1] As Rowe (1944, p. 57) shows, Sarmiento (1572) and Cabello (MS 1586) disagree as to the year in which Inca Huayana Capac died.

"*News of the Spaniards comes to Atahualpa.* Atahualpa was at Huamachuco celebrating great festivals for his victories, and he wished to proceed to Cuzco and assume the fringe in the House of the Sun, where all former Incas had received it. When he was about to set out there came to him two Tallanas Indians, sent by the Curacas of Payta and Tumbez, to report to him that there had arrived by sea, which they call *cocha*, a people with different clothing, and with beards, and that they brought animals like large sheep. The chief of them was believed to be Viracocha, which means the god of these people, and he brought with him many Viracochas, which is as much as to say 'gods'. They said this of the Governor Don Francisco Pizarro, who had arrived with 180 men and some horses which they called sheep ... When this became known to Atahualpa he rejoiced greatly, believing it to be the Viracocha coming, as he had promised when he departed, and as is recounted in the beginning of this history. Atahualpa gave thanks that he should have come in his time, and he sent back the messengers with thanks to the Curacas for sending the news, and ordering them to keep him informed of what might happen. He resolved not to go to Cuzco until he had seen what this arrival was, and what the Viracochas intended to do. ... As no further news came, because the Spaniards were forming a station at Tangarara, Atahualpa became careless and believed that they had gone. For, at another time, when he was marching with his father, in the wars of Quito, news came to Huayna Capac that the Viracocha had arrived on the coast near Tumbez, and then they had gone away. This was when Don Fransisco Pizarro came on the first discovery, and returned to Spain for a concession, as will be explained in its place."[1]

Just about the time when the Spaniards left Tangarara to march inland, open warfare between the Inca brothers had resulted in the capture of Huascar and his imprisonment in Andamarca, while Inca Atahualpa with a powerful army was at Cajamarca, the favourite Inca resort. Pizarro with his less than two hundred followers marched south from Tangarara to Motupe, near Lambayeque, and thence began to ascend the mountains to Cajamarca, out of the plains and valleys of the former Early Chimu Empire and into the Andean highlands. The geographical layout of the land thus made the arriving Spaniards ascend the plateau just where the legendary Tici Viracocha, on departing from the Titicaca highlands, had descended to the coast and gone north to Manta in Ecuador, whence the Spaniards had now come.

When Pizarro's little group entered the highland valleys of the lofty Andes they were in an unknown world. Atahualpa was well informed about their approach, and could have isolated and crushed them with his powerful armies, but the Inca did not permit his warriors to take up arms against the Viracochas. As Brinton (1882, p. 199) put it:

"I have yet to add another point of similarity between the myth of Viracocha and those of Quetzalcoatl, Itzamna and the others, which I have already narrated. As in Mexico, Yucatan and elsewhere, so in the realms of the Incas, the Spaniards found themselves not unexpected guests. Here, too, texts of ancient prophecies were called to mind, words of warning from solemn and antique songs, foretelling that other Viracochas, men of fair complexion and flowing beards, would some day come from the Sun, the Father of existent nature, and subject the empire to their rule. When the great Inca, Huayna Capac, was on his death-bed, he recalled these prophecies, and impressed them upon the mind of his successor, so that when De Soto, the lieutenant of Pizarro, had his first interview with the envoy of Atahuallpa, the latter humbly addressed him as Viracocha, the great God, son of the Sun, and told him that it was Huayna Capac's last command to pay homage to the white men when they should arrive."

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[1] The possibility should not be overlooked that the first message to Huayna Capac reached the Inca already during Pizarros first sailing to the northern tip of the Inca Empire in 1524. In that case Atahualpa was now learning of Pizarro's second journey south (1527), and the great lull of his disappearance could have been Pizarro's return-trip to Europe before his final return in 1531. It seems strange that Atahualpa should not be informed of Pizarro's sojourn at Tangarara.

When Inca Atahualpa arrived in his litter to meet Pizarro and his companions personally, he was accompanied by a vast and well-trained army of veterans, who were strictly forbidden by the Inca to injure the Viracochas. The Spaniards' answer to this reception was to seize the stoical Inca in the presence of his perplexed soldiers and to hold him prisoner against a ransom of a room full of "good gold". Shortly afterwards, the Inca was simply executed by the Spaniards, who felt this would serve their own purpose of conquest. Inca Atahualpa's half-brother Huascar, who at this time was held as a prisoner at Andamarca, had been making frantic sacrifices to Viracocha for deliverance from Atahualpa's vengeance. "When the news arrived almost immediately that strange White men from over the sea had captured Atahuallpa, Huascar's party concluded that the White men had come in answer to their prayers, and so called them *Viraqoca* [Viracocha]."[1]

The historic implications of the fact that Pizarro's party was mistaken for returning pre-Incas are so apparent that they deserve the attention not only of historians, as hitherto, but also of the mythologist and thus the anthropologist. Cieza and Inca Garcilasso emphasize the point. Cieza stresses that he has especially inquired among the Inca 'long-eared' nobles as to why he and his white countrymen were termed Viracochas from their first appearance in Peru, and he was told it was because they were at first mistaken for the sons of the departed god Tici-Viracocha. And Inca Garcilasso, who got first-hand information from his relatives, wrote: "Hence it was that they called the first Spaniards who entered Peru Uiraccocha [Viracocha], because they wore beards, and were clothed from head to foot, ... For these reason the Indians gave the name of Uira-ccocha to the Spaniards, saying that they were sons of their god, Uira-ccocha, ..." He stressed that this outward appearance ensured Pizarro and his companions their reverent reception among the Inca nation, and, as we have seen, enabled solitary men like de Soto and de Barco to criss-cross the country on expeditions without being assaulted, but instead, being humbly addressed everywhere as "sons of the sun".

We know of many similar instances, as when Pizarro sent three common soldiers to spy out the country between Cajamarca and Cuzco, or when Hernando Pizarro travelled for four months from Cajamarca to Pachacamac and Janca and back. Pedro Pizarro's description (1571 b, p. 301) of the siege of Cuzco in 1536 well illustrates how readily the little group of Spaniards might have been crushed during their Andean ascent of 1532: "So numerous were the Indian troops who came here that they covered the fields, and by day it looked as if a black cloth had been spread over the ground for half a league [nearly 2 miles] around the city of Cuzco. At night there were so many fires that it looked like nothing other than a very serene sky full of stars. ... When all the troops who that Inga had sent to assemble had arrived, it was understood, and the Indians said, that there were two hundred thousand of them who had come . . ." It is obvious that if these Inca armies had given them a hostile reception, no little group of 16th century Spanish swordsmen could have survived even though some of them had horses and a few had arquebuses with a limited supply of powder.

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[1] Except from Polo in Rowe (1946, p. 294 ft.n.)

When the Spaniards, in very small groups, had spread from the West Indies to Mexico, Central America and Peru, they had covered precisely the area formerly covered by the unidentified founders of the aboriginal American high cultures. No sooner was Mexico conquered than the local Spaniards marched across to the Pacific and built small sailing craft and started to explore the newly discovered coast and ocean. Thanks to the westerly trade winds and the strong North Equatorial Current, some of these small craft soon pushed out from the coast of Mexico straight across the Pacific ocean. It is most noteworthy from an anthropologist's point of view that all these first craft set out from ancient Mexico when venturing the push into the unknown Pacific. Thus they were all involved in the special winds and currents prevailing north of the Equator. They all missed Polynesia and passed straight into Micronesia, the Philippines and Indonesia. To return eastwards they had to go with the current up into the far North Pacific, far above Hawaii. It has been suggested that Gaetano might perhaps have sighted Hawaii in 1555 on his way back to Mexico, but this possibility has been eliminated by Dahlgren's (1917) monograph on the subject. Polynesia and Melanesia remained entirely unknown to the outside world until the settlers of Peru began to move.

Among the coastal population in aboriginal Peru, gossip and rumours of rich islands out in the ocean had been current since time immemorial, and began to fire the Spanish imagination also. The Spaniards heard such talk among the native merchants who owned the balsa raft fleet at Tumbez and other parts of north Peru, and they heard it again among the aboriginal deep-sea fishermen of Ica and Arica further south. (See further Part VIII.) They also learnt that such rumours among early coastal merchants had caused the famous Inca Tupac Yupanqui, some three generations before the coming of the Spaniards, to set out on to the ocean with a large flotilla of well manned balsa rafts in search of islands, two of which he presumably had found. This ancient Peruvian dream of riches in mysterious lands beyond the ocean led to the Spanish discovery of Polynesia and Melanesia. Sarmiento de Gamboa obtained consent from the Governor of Peru to sail, with the Governor's nephew Alvaro de Mendaña as the expedition's commander, in search of the islands sought for by Tupac Yupanqui.

The Mendaña Expedition left Peru (Callao harbour) in 1567 and sailed straight through Polynesia without sighting land until they reached the large Solomon Islands in Melanesia. On the second voyage (from Paita, Peru) in 1595, Mendaña ran into the lofty Marquesas islands, and the first Polynesians were there seen and described by our own race. Much to their surprise, the Spaniards found themselves to have been preceded in their discovery of these completely hidden oceanic islands by a population many of whom were expressly commented on as having a white skin, and they even came across individuals with very beautiful reddish hair. (See Part IV.) The Mendaña expedition had no interpreter, and nothing has therefore been left for posterity in regard to the impression made upon the natives by the Spaniards beyond the fact of a peaceful reception by light-skinned islanders paddling and swimming through the water in multitudes. But when the foreign expeditionaries had left, after killing a great number of the natives who came out to greet them, and shooting for amusement women swimming with children on their backs, none of these unfortunate natives ought any longer confuse these modern white visitors with their own god-men of the past. Yet Captain Porter (1815, Vol. II, p. 52) wrote from the Marquesas group during his early visit: "It may be worthy of remark here that the natives call a white man *Othouah* [Atua], their gods bear the same apellation, as do their priests after their death: a white man is viewed by them as a being superior to themselves, but our weaknesses and passions have served to convince them that we are like the human."

Handy (1923, pp. 11, 12), too, emphasizes that, according to a number of the early voyagers visiting the Marquesas, "white men" were referred to as *etua*, the specific name of the venerated ancestor-gods in the native genealogies. Handy speculates as to whether this was due to association of the white men with such local mythical teachings as that which claims that "Tane was fair with light hair and is said to have been the ancestor of the white race". He concludes: "All that one may say with assurance is that the Marquesas islanders, like the rest of the Polynesians, must, at some time prior to the first recorded visits of Europeans, have known of the existence of a white race,..."

It was different when Captain James Cook in 1778 discovered Hawaii on his way to the Northwest American Coast, as he was then able to communicate to some extent with this newly discovered branch of the Polynesians. The tragic outcome of this discovery resulted in a most detailed report being written on all minor episodes associated with it. The second volume of Cook's Pacific voyage in the years 1776—80 was written by the captain himself, and he says of his landing in the newly discovered Hawaiian group (1784, Vol. II, p. 199):

"The very instant I leaped on shore, the collected body of the natives all fell flat upon their faces, and remained in that very humble posture, till, by expressive signs, I prevailed them to rise." And about his walk to the water-pool: "... and every one, whom we met fell prostrate upon the ground, and remained in that position till we had passed. This, as I afterward understood, is the mode of paying their respect to their own great Chiefs." There was, as will soon be seen, a little more behind this boundless veneration of Cook's party. Of the Hawaiian men who came on board his ship, Cook (*Ibid.*, p. 214) also observed that: "... before they departed, some of them requested our permission to lay down, on the deck, locks of their hair." The meaning of this peculiar desire also revealed itself as events took their course.

Volume III of the same narrative, describing the death of Captain Cook, was written by his second in command, Captain King. We learn from him (p. 5) that, when the Englishmen returned to Hawaii in the year following their visit to the Northwest Coast islands, an immense crowd of Hawaiians paddled and swam out to greet them. A local high priest named Koah was then escorted on board Cook's ship: "Being led into the cabin, he approached Captain Cook with great veneration, and threw over his shoulders a piece of red cloth, which he had brought along with him. Then stepping a few paces back, he made an offering of a small pig, which he held in his hand, whilst he pronounced a discourse that lasted for a considerable time. This ceremony was frequently repeated during our stay at Owhyhee [Hawaii], and appeared to us, from many circumstances, to be a sort of religious adoration. Their idols we found always arrayed with red cloth, in the same manner as was done to Captain Cook; and a small pig was their usual offering to the *Eatooas* (gods)."

Later, when they landed, we learn from King that four men "marched before us, pronouncing with a loud voice a short sentence, in which we could only distinguish the word *orono*. Captain Cook generally went by this name amongst the natives of Owhyhee; but we could never learn its precise meaning. Sometimes they applied it to an invisible being, who, they said, lived in the heavens." As the solemn procession marched up from the beach, not a single person was to be seen except those who lay prostrate on the ground. Cook was led to a truncated stone pyramid on the edge of a field of sweet potatoes, the latter being an ancient Peruvian crop plant, as will be seen later. (Part VII.) The pyramid formed the foundation of a small wooden temple, and was "about forty yards long, twenty broad, and fourteen in height. The top was flat, and well paved."

Describing how the high priest Koah led the procession to the top of the pyramid, King says: "We were here met by a tall young man with a long beard, who presented Captain Cook to the images ..."After chanting a sort of hymn, Koah offered another hog to Cook, making him a long speech. "At this time we saw, coming in solemn procession, at the entrance of the top of the *Morai*, ten men carrying a live hog, and a large piece of red cloth. Being advanced a few paces, they stopped, and prostrated themselves; and Kaireekeea, the young man above-mentioned, went to them, and receiving the cloth, carried it to Koah, who wrapped it round the Captain, and afterward offered him the hog, which was brought by Kaireekeea with the same ceremony."

While Captain Cook was sitting aloft "in this aukward situation, swathed round with red cloth", in the same manner as the two wooden images he had just been introduced to, chanting and ceremonies went on during a considerable time, the crowd below calling *Orono*. By then a second procession had arrived, making great offerings of baked hog and other food, and in the end Cook was anointed with *kawa* by the priests and fed by the high priest Koah, who had, moreover, humbly chewed the food for him. Captain King concludes: "The meaning of the various ceremonies, with which we had been received, ... can only be the subject of conjectures, and those uncertain and partial ..."

On a later day Cook was conducted to the sacred houses of the priestly society, and was again offered pigs and wrapped in red cloth at the foot of a wooden idol in "a sacred building called *Harre-no-Orone*, or the house of *Orono* ..."

While Cook was thus being worshipped, the king had been engaged in a war on the island of Maui in the same group. On his return, new offerings of feather cloaks and pigs were made to Cook, and he was again wrapped in red cloth. At last came the day of departure, which much disappointed and grieved the islanders. No sooner had the Englishmen left before they ran into a gale and were forced to return to the same harbour. Their failure to master the elements made the natives very suspicious. Moreover, the Englishmen had also by this time managed to tell them all about their own god and king and country, and the natives had slowly begun to realize their mistake. When Cook and his companions returned they found that the high priest Koah had changed his attitude completely; he had discovered that Cook was not the ancestor-god Orono (or Rono) and he was now most hostile to the white visitor and his men.

The Englishmen were not so fortunate as Cortes in Mexico and Pizarro in Peru. When the Polynesians found out their own mistake, a small accident was enough to make them fall upon the visitors and slay Captain Cook, dragging his body inland before his men could prevent them. We know to-day that right from Kauai to Hawaii Island Cook was mistaken for the fair ancestor-god Rono, and the news of his 'return' spread like fire all over the group. Thousands of natives had assembled to catch a secret glimpse of the sacred and much talked of white god-men, while Cook had been solemnly led by the priesthood to Rono's own ancient heiau, the stepped pyramid with the little wooden temple on its summit.[1]

Captain King (*Ibid.*, p. 159) says in another connection about this unfortunate confusion: "It has been mentioned, that the title of *Orono*, with all its honours, was given to Captain Cook; and it is also certain, that they regarded us, generally, as a race of people superior to themselves; and used often to say, that great Eatooa [ancestor-gods] dwelled in our country." They also said of the principal image on the pyramid that it represented a certain favourite god of the island king—that is the same as to say an early tribal hero or legendary progenitor—and that he too came from the land of Captain Cook and his followers, or, as King puts it, "that he also resided amongst us."

We know to-day that it was the firm Hawaiian belief that their own great kings after death returned to the original Polynesian Fatherland outside the island world, and took up abode there as Eatooa (Pol.: *Atua*), or gods, among the original Polynesian ancestors of that land. The people of this most ancient fatherland were remembered as being *Haole*, or white men. (Fornander 1878, Vol. II, p. 285.) Orono (or Rono, Rongo, Rogo, Lono), was also one of the ancestor-gods in Polynesia, and had dwelt, since his departure from mortal ken, in the sacred Fatherland.

When Cook and his white followers arrived they were thus mistaken for visitors from the Polynesian Fatherland arriving under Rono's leadership. Thus the Hawaiians could say that great *atuas* dwelt in Cook's and his companions' country, and also that the favourite ancestor-god of the island king resided among the white men. This same confusion will also explain why some of the Polynesians who came on board Cook's ship asked for permission to lay locks of their own hair on the deck. To the Polynesian a part of his own spirit lives in his hair. Buck (1922, p. 40), in his somatologic study of Maori soldiers, was unable to collect hair-samples from his native friends, because, as he says, they would "suspect us of witchcraft if disaster occurred to anyone from whose sacred head hair had been collected." All the more remarkable is it, therefore, that Cook had no such trouble; the natives gladly took the chance and even sought to leave locks of their own hair on board his ship. The reason was obviously that they expected the hair to be taken back to the great Fatherland of the Polynesian race, and with it part of their own spirit, which thus could help to guide the rest of their soul after death to this same sacred and much desired destination, the home of the great kings and heroes of the past.

A strange corroboration is found more than three thousand miles to the south, on another island group also in the extreme east of Polynesia. This was half a century later, when Captain Beechey, as the first European, met the islanders of Mangareva during his call with H. M. S. *Blossom*. Beechey (1831) describes how a great number of Mangarevans came out to welcome him, not in canoes, but on a flotilla of sail-carrying log-rafts.[1] (See Plate LXXIX.) The natives were plainly of mixed breed, and as we have seen, some of them are described as very fair-skinned with beards and hooked noses. These latter dressed and looked like a distinct class, and among them was one who seemed to be a chief. None of the visitors knew the native language or what went on in the native mind. The friendly welcome in the course of the visit turned to open trouble, and Beechey narrates how his ship's dog was stolen. Generations later we learned that Beechey too had at first been taken for the ancestor-god Rono, or in Gambier dialect *Rogo* (also *Rongo*).

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[1] Ellis (1829, Vol. IV, p. 133), at the beginning of last century, met some of the natives who had actually been eyewitnesses to what happened during Cook's visit. They said: "We thought he was the god Rono, worshipped him as such, and, after his death, reverenced his bones."

Beechey's visit happened to survive as a Mangarevan tradition, and was passed orally from father to son until recorded in writing in the Tiripone manuscript. (Buck 1938 b, p. 94.) The natives, at first believing Beechey to be Rogo, whose return had been predicted, had brought their king Te Ma-teoa out to greet him. They had later been shot at, and apparently soon realised their mistake. Tradition proudly recorded that "Ikau and Kohaga stole a dog from the ship."

With the Polynesian ability for preserving traditions, it is noteworthy that Rongo should be brought to mind both by the Hawaiians and the Mangarevans when the Englishmen arrived.[2]

In Central Polynesia Rongo is closely associated with Tangaroa, and the two are sometimes said to be brothers. In Raiatea, Atiu and Samoa, Rongo is said to be Tangaroa's son. (Gill 1876, p. 14.) The Mangaians regard Tangaroa, Rongo, and Tane to be brothers, royal sons of the god Vatea (Atea). Strangely enough, they believed Rongo to have been "darkhaired", whereas his brother Tangaroa was the one who had "sandy hair". (Their brother Tane was blond-haired in Marquesan legends, and Atea, the father, was blond in Hawaiian accounts.) Anyway Tangaroa was considered "altogether the cleverest son of Vātea", who instructed his brother Rongo in various skills, like agriculture. But jealousy arouse between the two in the end, and the blond Tangaroa left Mangaia in the possession of Rongo, while he himself moved further west to take up abode in Rarotonga and Aitutaki. (*Ibid.*, p. 14.) This belief was also so firmly rooted in Central Polynesia that confusion arouse upon the arrival of the first Europeans. Gill (*Ibid.*, p. 13), who made a careful study of the Mangaia myths and memories during his early local stay,[1] writes:

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[1] In Hawaii the legendary Rono was memorized as having left for Tahiti or foreign lands in a "singularly shaped" craft. (Ellis 1829, Vol. IV, p. 134.)

[2] The importance of the early name Rongo is reflected by its sporadic occurrence in many parts of Polynesia. It does not only appear as the name of a deity who ruled in former times, but often to the god of agriculture, and even the god of war, and it also pertains to certain important skills or possessions that were ascribed to the earliest Polynesian forefathers. In the Marquesas group, *orongo* (also *o'ono*) was the term for the local "genealogy" taught by the learned native expert. Both in Easter Island and New Zealand *rongo-rongo* was the term applied to "writing", although Easter Island was the only spot in Polynesia where actual vestiges of a former knowledge of this art has survived. The picture-writings on the local wooden tablets were termed *rongo-rongo*, and we learn that one certain Hinelilu, who came with the legendary local discoverer Hotu Matua in a separate boat with "long-ears", "was a man of intelligence, and wrote rongo-rongo on paper he brought with him". (Routledge 1919, pp. 279, 281.)

When the Kon-Tiki expedition landed with a replica of a Peruvian log-raft in Raroia of the central Tuamotus in 1947, old natives were excited to find that we had come in a *pae-pae* (raft). They told us that such boats had been frequently used for navigating the seas in the earliest ancestral times, and that the oldest name for this type of craft in native songs and legends was *rongo-rongo*. (Heyerdahl 1948 b.)

"...all fair-haired children (rauru keu) in after ages were considered to be Tangaroa's (the god himself had sandy hair); whilst the darkhaired, which form the great majority, are Rongo's. ...Now and then a stray child might be claimed for Tangaroa, whose home is in the sky, *i. e.* far beyond the horizon; the majority of his fair-haired children live with the fair-haired god in distant lands. ... Hence, when Cook discovered Mangaia, the men of that day were greatly surprised at the fair hair and skin of their visitors, and at once concluded that these were some of the long-lost fair children of Tangaroa!"

Since we have seen that both Tangaroa and Viracocha, according to specific native statements respectively in Polynesia and Peru, are but alternative names for an ancestor-god otherwise known as Tiki, we reach the interesting conclusion that Pizarro and Cook seem both to have been mistaken for the same migrant culture-hero.

Even as far west as the Polynesian-affected parts of Melanesia, the arriving Europeans were associated with a formerly known and similar race-type. Riesenfeld (1950 a, p. 25) writes: "In Melanesian mythology, when the immigrants who introduced the custom of erecting megaliths into Melanesia are described they are repeatedly stated to have had light or almost white skin. The first Europeans coming to those parts were therefore frequently identified with them and called by the same name."

In his paper on the isolated Morioris of the Chatham Islands, Skinner also (1923, pp. 25, 50) shows that this southern Polynesian stock preserved vestiges of a sun-worship and sun-descent. When a Moriori was dying, another native "held the head of the dying man in the hollow of his arm, and, pointing to the sun, spoke as follows: Ascend direct above, to the beams of the sun, to the rays of the morning, ... to the source, to the sun, ..." When Captain Vancouver discovered the Chatham Islands in 1791 and the Morioris saw the first Europeans, they immediately suspected that these fair travellers must be solar gods of the same original line as their own sacred ancestry. Referring to Broughton's journal of Vancouver's discovery, Skinner says: "This sun cult seems to have affected their view of strangers, for Broughton says: 'On our first landing their surprise and exclamations can hardly be imagined; they pointed to the sun and then to us, as if to ask whether we had come from thence.' "

We have also seen that in New Zealand too, a light people, termed among other names Pakehakeha by the Maori, had been present before the arrival of the Maori fleet, and that the Europeans upon their arrival were immediately called Pakeha, a name they have retained in Maori tongue ever since. (Smith 1910 a, p. 131; Buck 1922, p. 38; Layard 1928, p. 219; etc.)

Comments and deduction

Surveying all these concurring data pertaining to the early existence of a light-coloured race in America and Polynesia, we find that tribal and national memories, iconographic art, physical inheritance, and burial remains from early periods, all unite to indicate, argue and emphasise the same thing: a Caucasian-like element, differing essentially from the

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[1] "The isolation of the Hervey Islanders," Gill (*Ibid.*, p. xii) says, "was in favour of the purity of their traditions, and the extreme jealousy with which they were guarded was rather an advantage than otherwise."

Mongoloid type, was formerly present in the territories concerned. It flourished sporadically in certain centres as an intellectually active and dominant minority, and then disappeared, lost among the hostile Yellow-brown masses by massacre, expulsion, or absorption. We shall soon examine the ruins they left behind among their successors.

If an American Indian had never seen a flowing beard in its right shape and its right place, he would never depict it in art and describe it in tradition. Imagination would make a benevolent god and solar culture institutor luminous but not fair-skinned. The successful combination of unusual culture and benevolence with both beard and a light skin is too much for coincidence. That this coincidence should have occurred several times, among Yellow-brown peoples of great empires and isolated tribes from Mexico with Yucatan to Colombia, Ecuador, Peru, Bolivia, and again on the nearest islands in the Pacific Ocean, is a little too difficult to believe, the more so since the European discoverers in Peru and Polynesia saw natives of the land with a whiter skin than themselves, and golden-haired individuals who were descendants of the gods—gods whose remains are probably found today in the Peruvian mummy caves of Paracas and among the *uru-kehu* of the adjoining ocean.

We began the present part of this book to see if there were any good reason to reject the most practical alternative that the Caucasian-like element in the complex Polynesian stock might have followed the natural ocean road down with the wind from South America. We knew that America had not been generally recognized as a centre of distribution of Caucasoid race elements before the arrival of Columbus. Our primary object was to consider whether the negative attitude towards the existence of Caucasoid or Caucasian-like migrants in pre-Columbian America was due to actual evidence against it, or merely to the absence of any obvious and urgent evidence for it.

We found that what we had ourselves suspected merely on the basis of indirect reasoning from facts observed in Polynesia, was already well known in Peru, where it had emerged spontaneously and existed in the shape of a yet unsettled problem. Instead of being new, the hypothesis that Caucasian-like individuals and Caucasoid traits had been present among the earliest American high-cultures was discussed among early explorers and chroniclers and subsequent students of art. The theory was not even new with Cortes and Pizarro, but was advocated in the early Aztec and Inca empires. Approaching the various channels available for information, native tradition, ancient portraits, preserved bodies, inherited peculiarities, and the psychological reaction on the American aboriginals of their meeting with Europeans, we found unified support of our theoretical assumption, casually even very strong arguments in its favour.

Those who defended the uniformity of the American race and the absence of Caucasian-like characters in pre-Columbian America were repeatedly driven from one hypothesis to another to account for existing evidence to the contrary. In view of the ample evidence at hand to support the Aztec and Inca tradition which tell us that European-like peoples lived in parts of America before the Spaniards, the burden of proof and explanation rests with those who feel that prehistoric America was strictly the home of Mongol types. In analysing the material presented in the foregoing pages, we have in every case attempted to discuss contrary suggestions also, whenever encountered.

Whereas subscribers to the theory of racial uniformity in pre-Columbian America generally concentrate on defensive measures, their most effective offensive arguments seem to be embodied in two questions: How could a small Caucasian-like minority maintain any distinguishing racial characteristics when making a prolonged migration from Mexico to Polynesia through Central America and Peru, an area occupied by millions of Yellow-brown men? And who were they?

The first question may be answered simply by pointing to the Jews of Europe, or better still to the nomad gipsies. Certain people take pride in their own stock and refrain purposely from intermarriage with those who may impurify their own breed. We have definite evidence that the same desire prevailed among the aristocracy of some of the peoples under discussion. We know how the Inca rulers and their near relations claimed descent from their "Father the Sun" through Viracocha, their earthly creator. The first Cuzco Inca, Manco Capac, was married to his sister, Mama Ocllo, a custum common in the Inca dynasty, originating obviously in a pious desire to protect and preserve their physical inheritance that it might not disseminate through the millions of aliens among whom they had settled as rulers.

Garcilasso (1609 b, p. 309) has provided the following information on this Inca custom: "They say that as the sun was married to his sister, and had caused the same marriage to be celebrated between his children, it was right that the same custom should be preserved by the heirs of the kings. They also did it to ensure purity of the blood of the Sun; for they said that it was unlawful to mix human blood, calling all that was not of the Yncas, human. They also declared that the princes married their sisters, in order that they might inherit the kingdom as much through the mother as the father: for otherwise they affirmed that the prince might be bastardised through his mother. Such was the strict rule which they established respecting the right succession of the inheritance to the kingdom."

The migration into Polynesia must obviously have been led by a people whose rulers were at that early time as conscious of the need to preserve their racial inheritance as were the Inca. In Tahiti, for instance, where the first chief Tiki descended from the sun and similarly married his sister (Ellis 1829, Vol. I, p. 112), as did a series of his early successors, the same belief prevailed that the common people were human, whereas "only in the vains of the chiefly families did the blood of the gods flow..." (Weckler 1943, p. 26.)

Friederici (1929, p. 443) says: "Among the Polynesians brother and sister marriage was very widespread; it was especially common in Eastern Polynesia, as may be witnessed in the groups facing America, like Hawaii, the Marquesas and Tahiti. ... The reason given for this custom was nearly always the effort to maintain purity of blood..."

In the genealogies of the families of Hawaiian chiefs brother and sister marriages are known since the group was first settled; the offspring of such marriages were invested with higher rank and called Aliipio, taking precedence over brothers and sisters of other unions. (Fornander 1878.) The Marquesan genealogy consists of a long list of gods married to their sisters and representing the background of the local chiefs down to the time of the discoveries. The thirty earliest generations of such rulers are recorded as brothers and sisters; after this the ancient relationship is no longer observed. (Beckwith 1911—12, p. 309.) Likewise in the Hervey group (Beaglehole 1938, p. 377), and in the highly sophisticated culture of Rarotonga, brother and sister marriage took place for the specific purpose of perpetuating families of high rank. In short: "With a few exceptions, as in Tongareva, close marriages were favored by Polynesians." (Buck 1932 a, p. 24.)

It can thus be seen that at least the central aristocratic body of a migrant people, with such a view of their own divine descent and such an understanding of race preservation, could reach Polynesia after a long stay in Mexico and Peru without being entirely intermixed en route. In fact, the racial peculiarities of such a migrant minority could survive with a high degree of purity so long as the ethnic group in question had sole executive powers and could restrict their marriages to their own closed circle. On their periphery, raciel elements might well leak out to be engulfed in surrounding multitudes of other breed, but this leakage would not polute the nuclear group and its close followers. If, therefore, they desired or were forcibly compelled to change their abode, the mere geographical transfer would not necessarily affect the race, although parties left behind and women captured by the victors could well cause strains of their blood to persist among the victorious tribes occupying their former home.

From the evidence analysed above it would seem that the Caucasian-like elements were far more common among ancient embalmed mummy remains on the desert coast of Peru than they were found to be, as living persons, in the same locality at the time of the European Conquest; also that they were much more commonly found among live individuals in Polynesia than in Mexico and Peru. This is just what we should expect if the people under discussion had formerly had their centre of activity in early Mexico and Peru, but only up to a certain period, when they migrated with the wind and the sun to remain in Polynesia. The fact that the *uru-kehu* strain seems to have been much stronger among the *patu-pai-arehe* or other pre-Maori-Polynesian than among the historic island tribes is a natural consequence of massacres and expulsions following the migration wave which caused new royal lines and hegemonies to be established on the islands in the beginning of the present millenium.

We know how these newcomers from "Hawaiki" behaved when they invaded the already peopled islands some twenty to thirty generations ago. Confronting their predecessors, dark or fair, they usually killed the men, sparing only women and children. In the course of the following generations, the fair racial components, provided they were better equipped intellectually, could perhaps recover some rank and social standing, but never again their former degree of racial integrity.

An early American ethnic group, with genealogical pride and ancestor-worship sufficiently demonstrated through social isolation and close marriages, can thus move comparatively unmixed through foreign habitats—a rather familiar phenomenon among migrating religious groups in history. They could do so more readily down the isthmus or along the sparsely populated coasts of tropical America than others could do among the civilizations of Asia Minor, Southern Asia, or Europe. The strong point of the opposing view seems to be the second question: Who were these migrants?

In default of an immediate answer it has been tempting to drop the subject as untenable and vain. This is wrong. We have their portraits, hair-samples and traditions, and should attack the problem, not put it aside. If we ask for the origin of the ruins at Tiahuanaco, San Augustín, or Coclé, we again fail to get a satisfactory answer. But although we cannot identify their background, they are still there. It is certainly true that it is dangerous to draw extensive conclusions from fragmentary evidence. It is easy to be incautious in the way we use known facts in an attempted reconstruction of the unknown past. Yet, is it not equally easy to be incautious in the way we leave out of count available evidence? It would seem that the cautious attitude rightly advocated by most contemporary scholars should apply not only to the part of the available information of which we make use, but also to that part we put aside simply because we cannot explain it or make it fit into the current picture.

When we find a Caucasian-like profile sculptured on the back of a prehistoric stele in southern Mexico (Plate XVII), it is widely accepted as a strange and undeniable fact, but it is put aside and no deductions are drawn from it. The question is whether caution of this kind does not amount to negligence. Who was depicted on this stele and in other American portraits of the same category? Certainly no personified light ray or stylized supernatural being, but an aristocratic Caucasian-like human, seen by, or represented by, the early American people who created these works of mature artistry and high cultural standing. Since we are apparently dealing with a locally extinct or departed race element, *this* may be the answer to our question: *who* were the migrants.

It is not necessary to carry the discussion further. An ethnic group of the same peculiar Caucasian-like stamp is traced from Polynesia back to pre-Inca Peru and the earliest culture levels of Mexico. We are getting back to periods antedating by centuries the earliest settling of Polynesia. The chronological seniority of the Olmec, Early Chimu or Paracas remains over the Polynesian island culture is sufficiently established to exclude a trans-Pacific origin of the American stock under discussion. Such a migration route is also entirely incredible in view of the practical barriers of distance, winds and currents. It may therefore be safely assumed that we are dealing with people whose ancestors had followed one of the only two well established and fully natural entrance routes to prehistoric America—the continental route from the north, as resorted to by the Yellow-brown race, or the marine route from the east, as used by the 15th century Europeans.

The practical feasibility of following the northern continental route is generally recognized and needs no further comment. The discovery of stray Caucasoid traits like heavy beards, aquiline noses, white skin, and reddish brown hair on the coast of British Columbia and its islands shows that such non-Mongoloid traits can develop out of the Yellow-brown race, or else spread through diffusion south or north through purely Yellow-brown territory adjoining the Asian gateway.

Yet one cannot help feeling that, natural as it is to look to the other side of the Pacific for the origin of the great majority of Yellow-brown Americans, it would seem as natural to look across the Atlantic for the vague Caucasian-like strain among them. The former may represent a continuous and therefore powerful human migration chiefly by land, the latter may represent mere stray craft blown across the sea by trade winds and ocean currents. It is not my intention unduly to stress this point, which has no bearing on the present problem. It would be wrong, however, to ignore entirely the practical feasibility of an early drift voyage across the tropical Atlantic. Few anthropologists seem much concerned about the fact that whereas Peru and Indonesia represent the antipodes, with exactly half the world between them, Africa and South America are separated by only 1700 miles—not even half the width of Micronesia—and with the most favourable conditions for a westward surface drift.

A voyaging party along the west coast of Africa, either from the south or from the north, has automatically ventured into either the South or the North Equatorial Current, both of which flow straight across the Atlantic to Yucatan and the extremity of the Mexican Gulf. They are in direct company with the eternally westbound trade winds. Venturesome early explorers, or lost weatherdriven craft off the Canary Islands or the West African coast, would therefore be likely to be drawn away from the Old World and end up where Maya and Aztec history begin.

There is a popular but erroneous belief that black people, if anything, would be all that Central America could receive with the African current in prehistoric times. Let us not forget that there are vestiges of a former people, like the Kabyle and other tribes in the Atlas area of northwestern Africa, who still occasionally have naturally red hair, blue eyes, beard, hooked nose and light skin. But were such people seafarers, did they venture off the coast of West Africa, out of the sight of land or into the grip of America-bound wind and current? And did they travel the sea with such a neolithic culture as would enable them to land in America without knowledge either of iron or bronze, and allowing the subsequent generations to remain ignorant of iron even till the time of Columbus?

We have evidence to answer all this in the affirmative. The Canary Islands lie just in the drifting water-masses we speak of. A drift from their shores to the West Indies is 1500 miles shorter than the drift of the Kon-Tiki raft expedition in the same natural conditions. It furthermore agrees with the natural route of Columbus who, like those in his wake, used the Canary Islands as a port of call on his voyage to America. When the Norman and Spanish conquerors reached the Canary Islands a few generations before the discovery of America, they found an aboriginal population part of which was of Caucasian race, light-skinned and tall, with blond hair, blue eyes, hooked nose and beard. (See Plate XXXIII **1**.) The origin of this people creates another problem for the student of pre-history and the oceanic spread of early peoples,[1] but they must certainly have come to the islands in seaworthy ocean-going craft. And when found in the late mediæval ages they still retained their neolithic culture.

Any people living on the shores of the Atlantic, with vessels and maritime ambition capable of leaving racial vestiges on the Canary Islands, *may* run the risk of setting similar migrants or castaways ashore in the Gulf of Mexico.

One may look east or north—or even for a local evolution—when searching for the origin of the Caucasian-like element in aboriginal America; it is incautious only to close one's eyes to their existence. In the present work it will be safe to refer to all the widely diverging ethnic groups which were at home in the New World before Columbus as aboriginal Americans, though it is a known fact that no American tribe or nation has an ancestry fundamentally autochtonous to its own domain. From a Polynesian point of view the Inca and the pre-Inca alike are strictly natives of America.

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[1] This oceanic people had no satisfactory explanation of their own origins; on Lanzarote they called their own island Maoh and referred to their own race as Maohreri. (Wölfel 1940, p. 75.)

PART VI

STONE HUMAN STATUES AND MEGALITHIC CULT-SITES

STONE HUMAN STATUES AND MEGALITHIC CULT-SITES

The stratification of wood-carving and megalithic art in Polynesia

The physical aspect of a country has usually some influence on the local culture. On the arid slopes of the Andean highlands, where forest was scant or absent and rock formations were abundant, stone was likely to become the dominant material in plastic and monumental art. This does not mean that all local tribes, or alien tribes in any rocky desert area, would be apt to raise monoliths and excel in carving stone, but it means at least that an immigrant stone-shaping culture would find ample encouragement from the environmental conditions to continue the former custom.

Entirely different was the geographical lay-out in the verdant forest country of the Northwest American coast. Giant trees and wood of almost any desired quality surrounded Yellow-brown man wherever he settled along this island-dotted coast. Wood naturally became—or remained—the chosen material for local house-construction, fortification, and all major aspects of building and monumental art. What stone was to the art and general culture of early Peru, wood was to the Indians of Northwest America.

If our assumption is correct, and Peru supplied Polynesia with its earliest inhabitants, while the original island culture was later overrun by the arrival of war canoes from Northwestern America, this mingling of cultures on the islands ought to have left behind it a certain definite stratification. This tallies to an astonishing degree with actual conditions in Polynesia.

The Maori-Polynesian population which arrived last and has completely dominated Polynesia in historic times is known on most of the islands for its conspicuous skill in wood-carving. We have already mentioned how some Polynesians excelled in decorating their canoe-parts, paddles, house-posts, mortuary columns, household dishes and various artifacts by wood-carving of outstanding quality. In this sphere Polynesian art ranks with that of the world's leading civilisations, and it was just here that we found detailed and comprehensive parallels and resemblances to the culture of the Northwest Indians. The Maori-Polynesians of historic times were not stone-workers. Generally speaking, their interest and skill in stone-shaping was, as among the Northwest Indians, limited to the forming of neolithic adzes, polished stone clubs and pestles, an occasional small household image, or minor ornaments or artifacts. With these and a few other exceptions, we may say for the whole of historic Polynesia what Archey (1937) stressed in speaking of the New Zealand Maori: "Where stone was used it was only crudely worked—obviously wood was the sculptors chosen material."

Yet we find, inside the present habitat of these wood-carving Polynesians, some of the most outstanding and impressive carved stone monuments ever raised in prehistoric times. The Polynesians have not been able to explain satisfactorily their origins, but they assert that the carved stones were not recent products but dated from the earliest era of their ancestral history (Tonga), or more often, that they were even the products of other people who preceded their own forefathers on the islands. (Easter Island, Marquesas, Hawaii.)

If the earliest Polynesian era had its roots among the stone-shaping cultures of arid Peru, and the subsequent conquerors were descended from the wood-carvers of the Northwest American forest lands, then this remarkable change or stratification in Polynesian material culture is but a logical consequence of geographical conditions in two American areas.

People and cultures may decay, become extinct, be expelled or absorbed, and yet never forgotten provided they built monuments in enduring stone. From the point of view of Polynesian investigations, it is a fortunate fact that the earliest and least known island invaders, rather than the existing Maori-Polynesians, were those who left stone monuments behind as enduring evidence of their cultural condition. For to trace and identify their ancient routes and relationships we need road-posts of such out-standing size and material that they do not disappear in the multitude, or decay in the course of centuries amidst conquering tribes and cultures. It is therefore natural first to take stone statues and other megaliths into consideration when we now attempt a more concrete and penetrating analysis of the relationships and migration possibilities of the original Polynesians. Culture-plants, racial traits, creeds and customs and other perishable but inheritable material have not, like the ancient stone monuments and edifices, been handed to us direct from the hands of their true originators.

Comparative study of American-Polynesian megaliths impaired by specialization

The tendency among modern anthropologists has been to regard the New World as a kind of blind alley with only a narrow entrance in the extreme north, through which primitive hunting and fishing tribes were able to come in on a one way trek from Asia. The result is that every sign of higher culture in the New World has been considered as having evolved locally and is regarded as an American phenomenon without outside inspiration, still less to have passed any inspiration on to the outside world. It is, therefore, as unusual for a student of Peru to obtain information about conditions out in the Pacific as it is for a student of Polynesia to take interest in Peruvian archaeology. This attitude is perhaps most natural and comprehensible in an Americanist, for the following reasons: It is difficult to study the abandoned stone statues and edifices of the Tiahuanaco culture without seeing the original connection with the Pukara monoliths a little farther north on the same plateau (Kroeber 1944, p. 101), and, in immediate conjunction with these, the stone sculptures and remains of the Chavín culture still farther north in Peru (Markham 1910). In Chavín, again, one finds an evident relationship with the remains at San Augustín in Colombia, in the extreme north of the Andean chain (Preuss 1928), and from here it is not far, either in distance or in artistic style, to the ancient monoliths and culture-sites of Central America (Stirling 1943, p. 1). In other words, the megalithic sculptures of Peru have deep and wide roots within their own continent, roots which lie in America far below the oldest cultural epoch of Polynesia—and far outside its practical range. From the point of view of an Americanist, therefore, Polynesia is superfluous as a link in the reconstruction of the local cultural growth of the New World, and as a rule it is merely found interesting to note, in a general way, that the inhabitants of some of the isolated small islands in the most easterly part of Polynesia have also learnt to carve monoliths like their neighbours in tropical America. From an Americanist's point of view it thus became the problem of *Polynesian* students to find out how human beings and high-cultures could have come into existence out in these cut-off island dwelling-places.

Nevertheless, certain Tiahuanaco experts have found it difficult entirely to ignore the possibility of some kind of connection between the stone sculptures inside their own geographical field of studies and a series of analogous remains on some of the islands in the ocean directly off Peru. Posnansky (1914, p. 13), who, through life-long local studies and excavations perhaps knew the Tiahuanaco sculptures better than anyone else, was led to entertain fantastic theories of geological changes in the Tiahuanaco period, because, *inter alia*, he maintained that the megaliths on Easter Island, and certain other islands still farther west, "could not have developed on their own". In his monograph on the Tiahuanaco site (*Ibid.*), he refrains from comparisons with other areas, but says with regard to the Pacific Islands: "Most of the structures of the aforesaid island-groups stand technically in intimate relation to those of the Andean highland."

The local Peruvian archaeologist, Valcárcel (1935 b, p. 27), well acquainted with all aspects of Andean megalithic art, had the same difficulties in ignoring the strong parallels between the great-stone shaping art of his own country and that on some of the nearest islands in the Pacific. He suggests that a conscientious analysis of the Easter Island stone sculptures, when compared with the Andean monoliths found from Colombia (San Augustín) to Bolivia (Tiahuanaco), may provide American pre-history with guide-posts that could outline the early cultural currents of pre-Inca Peru.

Beyond these and many similar references to Pacific island monuments no Peruvianist seems to have gone. They had neither reason nor need to look for an extra-American origin of their local megalithic art. The awaited comparative study was thus left open for the student of Polynesia.

In Polynesia, meanwhile, we have seen a one-sided tendency to turn attention in the opposite direction, towards Asia. One of the principal reasons for this is clearly the repeated affirmations of Americanists that the cultures of the New World were totally unable to exercise any influence overseas on account of the local lack of ships or other seagoing craft. (See Part VIII.) For instance, a leading Polynesian archaeologist like Emory, (1933, p. 48) who had suspected that certain aspects of the stone-shaping technique might have been brought to eastern Polynesia by early Peruvians who arrived on balsa rafts, admits that he was gradually caused by practical considerations to modify this opinion because, he says, he had later learnt from competent quarters that: "Balsa rafts become waterlogged in a few days if not taken out of the water to dry." (Morgan 1946, p. 80.)

While the local experts in Polynesia and Peru have each concentrated entirely on the study of megaliths of their own areas, anthropologists with a more general field of activity have not been able to avoid comparing the resemblances between these two contiguous regions. It may, indeed, be of interest to give some examples illustrating the commonest reactions.

Allen (1884, p. 251) expresses a very common opinion when he says, rather carefully, about the statues at Easter Island: "If it is merely a coincidence that these wonderful antiquities, so closely resembling in character those of Peru and Central America, should exist *on the very next land* to the New-world, it is surely a most curious one, . . ."

J. M. Brown (1924, p. 257) goes further: "Since the great-stone work of Easter Island and that of Peru have begun to be compared there has been a tendency on the part of those who know both to find a connection between them." Looking for a possible route of oceanic transfer that could satisfy such a prehistoric connection between Peru and the said island, he writes (*Ibid.*, p. 267): "We may rule out Easter Island as the medium of this influence, although there is so strong a resemblance between the work of the two areas. For it would not be easy or natural for voyagers from so far north to reach the American coast; to make sure of reaching it they would have to get far to the south into the latitude of the constant westerlies." He thus overlooked the alternative, that voyagers with the constant *easterlies* could get a fair wind from Peru *to* Easter Island, or to any other Polynesian habitat, and he passed at once to speculating on local land submergence.

Krämer (1906) took a different approach and observed what he termed "the American Indian type" depicted on some of the ancient statues and statuettes in stone and wood on Easter Island. He adds: "By this I do not intend to say that the existence of these lonely stone giants on Easter Island is directly due to an American influence. But undoubtedly another race existed here beside the Polynesian; the question is merely whether that race arrived from the east, from America, or from the west, from Melanesia." The author cautiously drops the subject after these alternative suggestions, and leaves it to others to wonder how the American Indian type could possibly have come to Easter Island from Melanesia.

Subscribing to the same formerly widespread but now strongly disputed belief that Easter Island was first settled by Melanesians,[1] St. Johnston (1921,p. 286) wrote: ". . . I still think that the ideas were too grand for such a [Melanesian] people, and that there was possibly a guiding influence from the east, from Peru. Had the ideas been Melanesian solely, why do we not find similar remains, of similar grandeur, in any single island of 'Melanesia', and if the idea had been Polynesian solely, why do we not find similar traces in Central Polynesia? Whereas we *do* find vestiges not unlike them in Peru." After this apparently logical reasoning, the author seems to have become confused in his attempt to adapt his conclusion to the current doctrine of a west-to-east migration in the Pacific, and he quickly adds that "any American influence in the Pacific can after all be merely regarded as a 'backwash' . . ."

Among the diversified efforts to find a logical explanation of the suggestive similarities between early Peruvian and Polynesian stone statues and other megaliths, those of Rivet (1926), and Imbelloni (1926 b) stand out in having apparently acquired some followers. Observing what Rivet (*loc. cit.* p. 143) terms "the remarkable similarity that exists between the pyramids, the megalithic constructions and the stone statues of Polynesia and America", this group of diffusionists finds the theory of Polynesian landings in Peru, with all the chronological complications thus involved, to be a sounder explanation than the proposal of pure coincidence or equability of the human mind.

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[1] Strong arguments against a Melanesian settling of Easter Island have more recently been presented by Shapiro and Métraux (1940).

A suggestion presented by J. T. Thomson as long ago as the last century has apparently made little or no impression. Without further explanation or any specified support for his assertion, Thomson (1871, p. 45), in his "Ethnographical Considerations on the Whence of the Maori", held: "The only place in Polynesia in which American remnants have been found is Easter Island; these consist of huge images, but the people who constructed them have passed away, and have been succeeded by a race having a common origin with the Maori, Sandwich, and Marquesas Islanders, all referable to Hawaiki."

It is worth noting that while some observers have found it necessary to propound the most diversified theories to explain the striking *resemblance* between the stone statues of Eastern Polynesia and South America, others have had the greatest difficulty merely in attempting to explain the *origin* of this strange cultural outcrop on little Easter Island. If the idea occurred locally, why did it occur sporadically on widely separated islands and only on those which were closest to America? And if it was brought from Asia, why was it not found anywhere on the immensely long migration route through Micronesia, Austro-Melanesia, and the whole of Western and Central Polynesia?

The last consideration alone is enough to enable one, on purely geographical and practical grounds, to declare that there is no reasonable possibility of the inspiration having come with a west to east migration across the Pacific. This obvious fact, indeed, has never been a subject of doubt or discussion among Polynesianists. Emory (1928, p. 118) has emphasised that not even small portable stone images have been observed in Central and Western Polynesia or in Micronesia, and that extremely few occur in Melanesia. Not till one has gone many thousands of miles against the wind, from Asia to the Tubuai and Marquesas groups, does one come upon the great monoliths in human likeness, and these increase in importance on the last island—the nearest one to Peru—Easter Island.

A migration from Indonesia to these eastern islands would require centuries of exploring voyages with settlements, population pressure, wars and fresh migrations. If the migrants had taken with them the custom of carving in stone and erecting monoliths in human likeness, a series of these would be found from settlement to settlement eastward across the Pacific. But they are not found. They begin and cease at the opposite end, and have their highest development on Easter Island, a few weeks from the coast of South America. From here they spread down wind and current wherever there is stone as raw material in the eastern extremity of Polynesia, to peter out and disappear before the longitude of the Society Islands is passed.[1]

This geographical distribution demonstrates plainly enough that the monolithic statues in Eastern Polynesia cannot be inspired from Asia, but only from South America, if they are not local inventions. Before considering the last-named possibility, we will see what background the South American megalithic cultures can offer to Polynesian research, so long as it is clearly understood that not one single generation, but just weeks, were necessary for a migration from this geographical area to Eastern Polynesia.

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[1] Such crude marking of a face as on the 'Kambak'-stones of New Guinea (Riesenfeld 1950) cannot be classed as human busts of this category.

Megalith sites and cultural diffusion down the Andes

The custom of carving and raising large stone statues, and the ability to do so, present perhaps one of the most striking and consistent peculiarities common to nearly the whole series of extinct American civilizations. In a few exceptional cases where stone statues and stonework are scant or absent, as among the adobe-making Chimu cultures, native traditions vividly describe important stone busts worshipped by the migrant generation of their ancestry. (Balboa 1576—86, Bk. 3, Chap. 17.) Among the many Americanists who have pointed to this noteworthy fact is Stirling (1943, p. 1), who says:

"The practice of carving and erecting large stone monuments was one of the conspicuous achievements of the aborigines of tropical America, from northwestern South America to and including a considerable area of southern Mexico. In the south this pratice was most common in Peru and Colombia. From this region northward, the distribution is more or less continuous ... Although the art styles employed and the nature of the monuments differ considerably through this rather large region it seems evident that a certain interrelationship exists, an understanding of which should cast considerable light on the chronologies and pre-Columbian cultural exchanges between the two continents, especially since the monument-distribution area involves most of the high-culture centers of the New World."

The distribution of stone human statues in South America ends in the south with the area that was under Tiahuanaco influence south of Lake Titicaca; in the north it has no marked borders, as it extends along the Andes to San Augustín in Colombia, whence through Coclé in the bottle-neck of Panama, it is geographically linked with the rest of the American distribution area represented by Central America and Southern Mexico.

The prominent Peruvian archaeologist Tello (1928, p. 283) suspected a direct connection behind this coherent trail of megalithic sculpture down the Andes: "Perhaps it would not be too venturesome to affirm that the area of the Archaic Andean culture, revealed by its architecture and sculpture, extended on the south to Tiahuanaco and on the north to San Augustín in Colombia, for some of the structures and sculptures of these places present certain analogies to the monuments which have served to characterize this culture, and to define the first stage of the Andean civilization."

San Augustín, at the northern end of this Andes system, represents the façade towards the old high cultures of Central America. Like Tiahuanaco, we know this culture only through the remains which its prehistoric creators have left behind. At San Augustín these consist in the main of over three hundred different stone sculptures and monoliths in human likeness spread over a fair-sized cult site in the forests at the sources of the river Magdalena. On the arrival of the Spaniards in 1538 San Augustín was just a collection of abandoned prehistoric monuments.[1] The primeval forest has overgrown this former centre of cult and culture to a degree which indicates a considerable age.

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[1] In his paper on "The Archeology of San Augustín and Tierra-Dentro, Colombia", Alba (1946, p. 859) writes: "Neither the *Andaquí* who dwelt in the San Augustín region nor the *Páez* living in Tierradentro at the time of the Conquest were aware of the archeological remains in their territories. Likewise, the culture of these Indians gives no indication that they might be the descendants of the peoples who left these monuments. Ultimate identification, then, of the builders of San Augustín and Tierradentro must await broad comparison throughout the Andean region, and above all more excavation."

Bennett (1949, p. 80) says: "By analogy with the stone sculpture of Peru and Central America, San Augustin falls into the Early period in Colombia." And (*Ibid.*, p. 78): "The rolling forest-covered hills at the headwaters of the Magdalena River do not appear to be a favourable region either for the support of a large population or for the development of an advanced culture. Yet here are found the San Augustin stone carvings and temples that represent the earliest known remains in Colombia."

In a passage based on an interesting piece of purely geographic logic, the same author (*Ibid.*, p. 21) shows that San Augustín is right in the natural track of prehistoric migrants from Panama to the Andean highlands. Land-hunters and collectors migrating to South America via Panama could easily enter the Andean highlands by following the valleys of the Cauca and Magdalena rivers, both of which begin in the Andes and flow from south to north. Some groups could have turned off eastwards into Venezuela, but further expansion in that direction would probably be blocked by the Amazon jungle. Land migrants along the Pacific coast of Colombia and Ecuador would also run into mangrove swamps and jungles, whereas an ascent of the Magdalena river to San Augustín would from there on take the southbound wanderers into open highlands which also offered a reasonable quantity of game and other food. Once up there, there would be no barriers to a continued southward migration along the high plateau to Chavín, Pukara and Tiahuanaco. Leicht (1944) has shown that other parties may have pushed by sea along the coast, and that these two branches may have joined in the coast-bound mountain valleys near the Chavín and Chimu areas of North Peru.

We may note that a leading authority on San Augustín, Preuss (1928; 1931), who has alone discovered and excavated about hundred of the local stone statues, stressed (1928, p. 234) that the most evident connections with that prehistoric cult site were to be found in Chavín, in the North Peruvian highlands. Chavín, or Chavín de Huántar, is another early and abandoned pre-Inca cult site of the Andes, where early megalithic architects have left behind more carved stone slabs and a number of anthropomorphous stone statues. Preuss also shows how a monolith, representing what seems to be a sun-god holding a vertical rod in each hand, is common to San Augustín and Chavín and reappears again as the central figure carved in relief on the monolithic Gateway of the Sun at Tiahuanaco.

With the Magdalena river and San Augustín marking a natural entrance route for southbound migrants from Central America, and with San Augustín again linked up geographically and archaeologically with the early Chavín high-culture of North Peru, we possess a gateway from the north to the early cultural horizon of the pre-Inca domain. For, although the inter-Andean chronology is yet uncertain and open to much discussion, Chavín seems either to hold the important key position, or else at least to be basically involved in a cultural relationship to the various Andean civilizations.

To show in how unsettled a state the developing Peruvian archaeology still is, we may briefly revive the current opinions on this subject. Markham (1910, p. 392) began the first systematic comparison between the extinct Andean cult sites of Chavín in North Peru and Tiahuanaco in the former South Peru (the present Bolivia). He found so much resemblance between the stone work of these two pre-Inca cultures that he believed that if the stone monument at Chita in the valley of the Vilcamayu and that at Cuzco had not been deliberately destroyed, it would perhaps have been possible to trace the direct transition from the Tiahuanaco to the Chavín style. His conclusion was: "The result of a careful examination of the carving on the stones is that the same general idea prevails on both, that they represent the genius of the same people and the same civilization though at different periods, the stone of Chavín being the latest."

Tello (1928) took the opposite view. He held that the Chavín culture was more basic and that it was Tiahuanaco in the south which had received a cultural inheritance from Chavín. He extended the comparison as far north as San Augustín.

Means (1931) did not find the artistic style of the Chavín culture to be basic, but rather conventionalized, and he suggested that Chavín represented an amalgamation of impulses, partly from the early Chimu and Nazca cultures on the coast and partly from highland Tiahuanaco. He agreed that the stone carving of Chavín and Tiahuanaco must have derived from the same underlying concept, and stressed that the apparent similarity lay in the fundamental ideas and style of cutting and treatment rather than in the details of surface pattern and design.

Bennett (1934, p. 485), in his Tiahuanaco study, confirms that the theory which makes the Chavín and Tiahuanaco monoliths elaborations of a basic, widespread culture "has been confirmed many times", while he finds that the problem remains "as to whether Chavín is, historically speaking, influenced by Tiahuanaco culture or whether the reverse is true."[1] Later (1942; 1943; 1944), after thorough studies of Chavín and adjoining culture-areas of North Peru, he emphasizes that the recent discoveries by Tello, Hoyle, Willey, Rowe, and others "show that the Chavín style itself is not limited to the north highlands, but appears as an isolated style or a design influence throughout most of Peru. ... It is not certain that the site of Chavín represents the centre of development and distribution of the style." (1943, p. 323.)

He stresses (*Ibid.*, p. 325) that the Pacific coast now has "numerous Chavín sites", and that Chavín as a style and probably as a period must have been widespread, extending from Piura on the far north coast of Peru to Paracas on the south coast, and from Chavín in the northern highlands probably to Pukara north of Lake Titicaca. He compares this wide distribution with the historically known dominance over all Peru in the Inca period, and again with that of Tiahuanaco in pre-Inca time, and concludes (*Ibid.*, p. 326): "The dominance and distinctiveness of Chavín style, the antiquity, and the known wide distribution definitely suggest that we must add still a third pan-Peruvian period to the Uhle sequence in Andean chronology."

Kidder (1943) opposes this view of the wide and unified expansions in pre-Inca Peru, but Kroeber (1944, p. 115) accepts it, saying: "Specifically, there have now been established three ancient cultures which were almost pan-Peruvian—Inca, Tiahuanaco, Chavín ..."

Pukara, which Bennett considers to be at the southern end of this Chavín expansion, is another extinct and unidentified megalithic cult and culture site of the pre-Inca age. It is located north of Lake Titicaca, in the department of Puno. Pukara is best known for its megalithic enclosure and a great number of stelae and stone human statues discovered on and below the surface of the ground. While Tello showed the resemblances between

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[1] Bennett (1949, p. 193) also says: "There are many indications that Tiahuanaco was built at intervals and that much of it was never completed."

Pukara and Chavín, Kroeber (1944, p. 101) stresses closer resemblances between Pukara and Tiahuanaco.

Kidder (1943 p. 38) describes stone statues (and statuettes) from a wide area of the northern Titicaca basin, and shows that they often display resemblances to Tiahuanaco stone sculptures, but on the whole even more to those of Pukara.

Rowe (1944) describes for the first time the pre-Inca Chanapata culture in the Cuzco area, located between Pukara and Chavín, and we learn that it shares traits with both these two Andean neighbours as well as with Tiahuanaco.

Valcárcel (1935 b), who for years has probably contributed more to our knowledge of the Pukara site than anyone else, reverts to Tello's opinion that Pukara must be connected somehow with the whole megalithic sequence of analogous cult sites from San Augustín and Chavín in the north to Tiahuanaco in the south. He adds, as stated, that only when this whole interrelated complex of Andean megalithic art is compared also with the remains on Easter Island can we achieve a full understanding of the spread and sequence of culture in this area.

Although many attempts have been made to point out striking correspondences, both in general appearance and in certain details, between Chavín stone carving and that of early Mexico, Central America, and Ecuador (Joyce 1912, p. 177; Lehmann 1924, pp. 35, 40; etc.)[1] yet it would seem safe to conclude from existing opinions that Chavín is perhaps most strongly linked with San Augustín to the north, Pukara and Tiahuanaco to the south, and the Chimu area on the coast below.

When we now come to the last and southernmost of these great and long abandoned cult-sites in the Andes, Tiahuanaco, we find opinions to be just as varied. Those who follow Uhle believe that the Early Chimu and Early Nazca antedate Tiahuanaco, and suggest that influence was originally brought to bear upon Tiahuanaco from the Pacific coast down below.[2] Those who follow Tello believe instead that Chavín antedates Tiahuanaco and represents the centre which sent the cultural impulses down south to the Titicaca area. Those who follow Posnansky make Tiahuanaco itself a centre of such antiquity that cultural inheritance from other sites cannot even be considered.

Montell (1929, p. 15) points to the numerous and often quite absurd theories which have been presented since the time of the Conquest concerning the origin and background of Tiahuanaco, without the problem yet being definitely solved. Karsten (1938, p. 28) goes further, and expresses the opinion that in spite of the many existing theories, the Tiahuanaco problems will probably never be satisfactorily solved.

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[1] Joyce, and many with him, have also seen strong resemblance between elements in Chavín and Nazca design; and Bennett (1949, p. 124) claims that the Chimu area and coastal North Peru in its B. C. 'Cultist Period' includes many local cultures and sites which, in spite of their wide distribution, are linked by the Chavín style horizon. He brings Ancon into this relationship with Chavín. (1949, p. 97.)

[2] Means (1917) modifies Uhle's view in proposing that the early era of Tiahuanaco (Posnansky: Tiahuanaco I) was probably contemporary with the Early Chimu and Early Nazca cultures on the coast, but that a subsequent Tiahuanaco era (Tiahuanaco II) no less probably derived at least in part from the Early Nazca. He dates the Tiahuanaco I period from the second century B. C. all through the first half-millennium A. D. while the Early Chimu and Nazca cultures arose from the archaic on the coast below. At the end of this period the expansion occurred, bringing the highland and coast cultures into contact with each other, and resulting in the rise of the Tiahuanaco II empire. If Means' theory is right, it is interesting to note that this expansion and unrest in Peru roughly coincides with the peopling of Eastern Island and Polynesia about 500 A. D.

The ruins of Tiahuanaco are located in the highland plains of the present Bolivia, some twelve miles south of Lake Titicaca. The site includes the most imposing pieces of megalithic art and architecture in early South America, and represents one of the principal cultural centres of the New World. Besides the megalithic temple enclosures, the semi-artificial pyramid, and the monolithic gateway, one of the most noticeable aspects of the Tiahuanaco cult-site is the great number of anthropomorphic stone statues which have been carved and raised by the unidentified local settlers. The number of these statues was considerably larger at the time of the European conquest than today, since many have been deliberately destroyed and others mutilated, while some have been removed for preservation by the Bolivian authorities, or placed as curios at the entrance to the nearby village church. Again, through excavations, a couple of anthropomorphous statues have more recently been recovered from underneath the debris of the ruins. Bennett (1934, p. 460) lists some thirty Tiahuanaco statues still known, and shows that Father Diego de Alcobasa describes many others, not identifiable among those known today.

Bennett, in the final conclusions to the same work on the Tiahuanaco site, shows that it seems to have been the centre—perhaps chiefly a ceremonial centre composed of an aggregation of ecclesiastic constructions—of a pre-Inca highland culture the influences of which reached right down to the Pacific lowlands and are traceable all along the coast. He shows (*Ibid.*, p. 490) how the Tiahuanaco style spread throughout much of Bolivia, Peru, Chile, and Argentine, and that it reached as far north as to the Pacific coast of Ecuador, where the Tiahuanaco style can be seen in the carving on the edges of the stone seats and carved slabs of Manabi. This, we may recall, is the locality where the Viracochas from Tiahuanaco were remembered as having assembled before they departed into the open Pacific.

Bennett finally emphasizes that archaeological studies in the early Peruvian strata must allow for a considerable interplay of cultures, for archaeology shows that llama products, originating only in the highlands, had been available on the coast since the earliest times, a definite proof of the great antiquity of barter and contact between highlands and coast. He shows that although the individual styles are often geographically localized in the Andean region, this ought not to distract the student's attention from the fact that "the problems of Peru cannot be solved from one locality."

If nothing more can be considered proved today, it is at least safe to note that, underlying the local styles and surface pattern which readily distinguish the different culture-centres of aboriginal Peru from one another, there is to be found a continuous thread of basic and fundamental unity in idea and desire, which runs now here and now there between the megalithic cult sites of the Andes, and sends impulses out to nearly all tribes and culture-areas in the highlands as well as down on the coastal plains. Chavín remains as a geographical stepping-stone between San Augustín and Tiahuanaco; but whereas Tiahuanaco represents a southern limit of the megalithic expansion, with nothing to fall back upon further down the continent, so did San Augustín represent the South American gateway from the Panama Isthmus, with the whole culture area to the north whence it could naturally draw inspiration.

The abandoned megalithic cult sites, with their stone statues, remind us to-day of deserted islands wich had once been centres in a sea of vivid cultural exchange and sudden progress. In America aboriginal high-cultures never arose far from abandoned ecclesiastic-sites containing megalithic monuments such as these, nor do we ever find a single cult site of this or a similar nature in any area outside the limited inter-tropical area of American civilizations. It is equally certain that none of these megalithic cult-sites were served by any known group of historic Indians, and that no tribe was busy sculpturing and erecting the said stone human statues when Europeans first arrived.

The stone men as ancestral figures

We have seen in Part V how native memories and worship of a migrating hierarchy with beards and light skin are intimately associated with the same limited geographical area, a memory which is borne out by the features on a few of the portraits depicted by the ancient sculptors. We saw that such Caucasian-like people were remembered as the original occupants of the Tiahuanaco site, and that their supreme priest-king had ordered the stone statues of Tiahuanaco and elsewhere in the Titicaca basin to be raised as representing the ancestors of the various tribes of the Collao. They are thus most likely to represent ancestral figures, and were idols and gods only to the extent that the religion instilled by the hierarchy of the sculptors was one of ancestor worship. But so far as the hierarchy itself was concerned, their own ancestors take mythical shape in the very morning of time when the lineage of kings becomes identified with a solar creator.

It is interesting to note that Kidder (1943, p. 38), in his archaeological survey of early stone human statues around the northern part of Lake Titicaca, found in a wide variety of forms resemblances both to Tiahuanaco and Pukara, for which reason he suggested that: "... individual sculptors, or groups of sculptors, could have travelled about in the Collao as specialists. This is mentioned to make clear the lack of an assumption that sculpture was *always* the product of local cultural inspiration."

At Pukara also native traditions were able to tell us that the local statues were ancestral figures. The first mention of these stone figures also dates from the time of the discoveries. Sarmiento (1572, p. 30) was told by the natives in Peru that according to their legends the monuments at Pukara represented the first human beings to come there as immigrants after *Unu Pachacuti* (the deluge) in their original country. Viracocha made stone statues of these migrants as a memorial of that event.

Referring to the conspicuously wide dispersal of stone statues in the megalithic cult sites along the Andean chain, the Peruvian archaeologist Valcárcel turns his attention to the Indians' own legends, which have survived with these monuments down through the ages from generation to generation. He remarks (1935 b, p. 27): "Wherever Wiracocha proceeded, human stone statues ('anthropoliths') appeared from caves and hills, founding families and villages, now on the borders of the great lake, now in the basins of the Collao or in the smaller valleys of the mountains. Men of stone were first made, from whom the others descended; in stone they also immortalized their religious symbols. Along the whole extension of the great Andean highlands, from Titicaca to San Augustín in Colombia, the stone sculptures are found dispersed, testifying a certain unity of art and conception." He adds that only when the statues on Easter Island are also examined in connection with this whole series of Andean anthropoliths: "The stone men will be found to resume their march to mark out the route of the aborigines, and the intercrossings between the avenues of contact between the different groups."

Independent evolution behind Polynesian stone statues unlikely

With a trail of anthropomorphic stone statues from early Mexico down through Peru, we may well agree with Allen in his comment that their reappearance on Easter Island, the very next land to ancient Peru, is at least a most curious coincidence. Stone giants in human form are not very commonly carved and raised among the aboriginal peoples of the world, it is a feature not even general to megalithic cultures. Thus, as McMillin (1927, p. 218) pointed out with regard to those of Tiahuanaco, they represent a class of sculpture which seems to be entirely lacking among European ruins or vestiges of comparable culture.[1] Now, when we proceed to a comparative survey of the Andean and Polynesian stone statues, it may first be wise to consider whether the idea and the technical and artistic ability are likely to have come independently to the aborigines of these two East Pacific habitats.

We have already seen that the limitation of the statues to the most easterly islands of Polynesia proves that the custom cannot have been carried from island to island by an Asiatic migration across the Pacific. Micronesia and Western Polynesia leave no gateway open for inspiration from the west, but Easter Island has a most provocative location as a gateway to Eastern Polynesia from Old Peru.

There is a whole series of strong and compelling reasons for believing that the statues in eastern Polynesia are the result of foreign inspiration rather than of local evolution. Firstly, the archaeology of the islands where they have been raised, like Easter Island, Pitcairn, the Marquesas, etc., show no local signs of experiment and evolution in method and skill. The monolithic figures have been carved and erected with a clear and mature idea in the mind of the sculptor, and certainly by experienced hands. These islands are very small, and on Easter Island there is no forest, like the jungles of Yucatan, to cover ancient vestiges on the stony and barren grass-land with heavy humus. Sculptured stone does not readily deteriorate, and would remain for posterity whether it is made by skilled and experienced sculptors or represent a primitive and experimental period. Yet we find no traces of such an evolutionary period.

The time allotted for a necessary evolutionary period seems also to be conspicuously short in Polynesia, and shorter on Easter Island than on any other island in the whole Pacific, had the aboriginal immigrants actually come from the west. And yet the statues were not caught in the midst of their evolution when the island was reached by European discoverers, for the sacred terraces of these grandiose monuments no longer received attention. Cook (1777, Vol. I, p. 296) wrote of the statues at Easter Island that they "sufficiently shew the ingenuity and perseverance of the islanders in the age in which they were built; for the present inhabitants have most certainly had no hand in them, as they do not even repair the foundations of those which are going to decay."

It would be difficult enough to find in a tiny neolithic community like that which inhabits Easter Island sufficient manual labour to organise and execute the skilful transportation and erection of giant monoliths; it is certainly not possible for so small and so isolated a group of islanders to evolve in their midst what has otherwise been achieved only by some of the greatest powers of the Old and New World.

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[1] It is thought-compelling to note that to this comment by McMillin in the Nat. Geogr. Mag., the following footnote was added: "Of interest for comparative purposes, see *The Mystery of Easter Island*, by Mrs. Scoresby Routledge, in the National Geographical Magazine for December, 1921."

The styles, too, of the Easter Island and Raivaevae statues, for instance, are so markedly distinct that it is not possible to suggest that the one is a direct copy of the other. Obviously the stone-sculptors who settled on these islands and the other Polynesian groups nearest South America had not copied one another, nor had they developed their statuary independently of each other, but they had carried into the East Pacific certain basic concepts which each in turn put into use in his own new island home. The style may differ from island to island, but, as in South America, we can see a fundamental unity.

Before we consider divergencies and conformities in style and detail, let us first consider some of the basic problems confronted by these megalithic artists. A certain number of writers seem to consider megalithic sculpture a natural pastime for a primitive people who have nothing much to do but sit down and hack at a rock. They seem to overlook the fact that to a culture based on stone tools rock is the symbol of solidity and the least tempting substance for monument carving.

If an observer of native island life attempts to settle the local valleys in the original way, without the aids and means of modern man, as was attempted by the present author in the Marquesas Islands in 1937—38 (Heyerdahl 1941 a), he is likely to find boulders and rocks inviting as building material for walls and foundations; but it would certainly not be very natural to start shaping and dressing the stones to fit one another rather than to select angular rocks that rested naturally against each other while filling the gaps with smaller stones. And one may safely assert that nothing would seem less inviting and less natural than, with stone tools, to approach a mountain side with the intention of carving out a large block in the likeness of a man. If this urge did not bother an east-bound Polynesian migrant before he reached the islands closest to America, he was not likely to be beset with this inclination even there unless met with some local inspiration that had arrived from the other direction.

Before any writer feels justified in brushing aside the existence in Polynesia of anthropomorphous monoliths as a natural and readily conceivable development, he should at least take an axe and approach a giant boulder or a solid mountain-side with a view to showing how easily such a culture element may be achieved. If he finds that a successful result is not attained as easily as he thought, he should bear in mind that the Polynesians and the Peruvians did not even have iron, but created their megalithic monuments with the aid of stone tools which themselves had been shaped only by rubbing against or hammering with other stones. Such tools were left in the Easter Island quarries, and also throughout pre-Inca Peru. In the subsequent Inca period the Peruvians had acquired bronze, but the Incas did not in general sculpture stone statues. And although they maintained the former custom of quarrying stones for walls and fortresses, we learn even about the Incas from such an authority as Garcilasso (1609 b); "Their quarrymen used black pebbles, called *hihuanas*, for working the stones, rubbing instead of cutting them."[1]

[1] Technical studies of the prehistoric monoliths of San Augustín, Colombia, also show traces of the use of stone tools, and these tools, cut from andesite and similar hard rock, are found locally in large numbers. (Alba 1946, p. 854.)

Technical achievement of megalithic transportation in Easter Island

The quarrymen of Easter Island have never been seen in action by our own race, and the wood-carving natives found on the island by the first Europeans possessed no information about the origin of the colossal statues found there. This does not mean, however, that we have no information as to how the big statues were planned and carved. A sudden interruption of all work in the image quarry has left us with an interesting cross section of the daily operations, demonstrating furthermore the whole procedure of the manufacturing method.

The quarry is in the extinct crater of Rano-Raraku, near the eastern corner of the triangular island. Here are still to be seen the empty niches of the many statues which have been removed and in many cases transported over the rim of the crater to various destinations on the island. Beside the empty niches, 157 statues in different stages of completion are still left in the quarries. (Métraux 1940, p. 292.) Strewn about were formerly also the abandoned tools of the workmen: large, roughly chipped stones of the same nature as the hard nodules (lapilli) which occur in the volcanic tuff from which the statues themselves were carved. The stone chisels found *in situ* represent one rougher and one finer type, the former apparently used for roughing out the contours of the figures. The final polishing of the statues was done with abrasive volcanic stones. (*Ibid.*, pp. 278, 293.)

The sculptors began their work in the crater wall by chipping away enough material from above and around the future monoliths to give enough room to work freely. In certain cases the workmen's niches are visible in the alley-way around the statue, and their number indicates the very limited number of sculptors who were occupied with each statue at the same time. The statues were carved face upwards, and unfinished figures show that the front and sides were completed, even to every detail of the hands, before the undercutting began. The rock beneath was then chipped or rubbed away till the huge statue rested only on a narrow keel running along the spine. In the next stage to be seen the statue is completely detached from the rock round it and then chocked up by a number of smaller stones, quite ready to be launched and transported.

The work accomplished up to this point is the result of skilled labour directed by artistic talent, mathematical exactness, and long experience. Then begins the toil of the great numbers, organized and supervised by men well acquainted with the enormous engineering problems connected with the transportation and handling of cyclopean monoliths. Some of the statues to be transported were over 30 feet long and weighed as much as fifty tons or more, the approximate weight of 120 horses, all in one long, unwieldy and brittle stone-figure. Many of the monoliths were not removed very far, being erected on the slopes inside the crater, whereas others were transported up over the steep rim of the crater wall and thence over the rugged surface of the island to their final destination miles away from Rano-Raraku. As the front and the sides of the giant stone men had already been finally carved and polished to perfection, the greatest care and utmost skill were required in moving them to prevent injury.

Such inclinations and such working methods do not come naturally to an ordinary crew of eastbound Polynesian deep-sea mariners and fishermen. They result from ideas that come from a continent. Desire and imagination are not enough: routine and experience inherited from a nation of some size are necessary for a small group of pioneers on a barren island to tackle such immense technical tasks as those mastered by the earliest inhabitants of Easter Island.

When a stone colossus arrived at its destination, which in the case of most of those which went to remote parts of the island consisted of an *ahu*, or ready-built stone platform, the chief engineering problem was to raise the enormous figure to a standing position. The smaller *ahus* held only one statue, but five statues was the average for *ahus* of medium size, and the larger ones supported up to thirteen and fifteen. (*Ibid.*, p. 293.) Most of the statues erected on top of the *ahus* were from twelve to fifteen feet tall, with larger figures up to thirty-three feet (10.27 m; Skottsberg 1920, p. 9). These *ahu* images are expanded at the base to rest upon the stones, whereas the images raised upon the slopes about the quarry, some of which are even larger, taper into a sort of peg for planting in the ground.

It is quite apparent that no combination of men grouped about a thirty-foot stone giant could be strong enough and tall enough to push the giant into the perpendicular. Nor was there any point near the *ahu* from which men with ropes could pull the statue's head upwards. Furthermore, as if the problem of raising the monument itself was not great enough, the architects complicated their own task by settling a huge cylinder-shaped piece of reddish rock upon the very top of the giant's head. How could a small community of native seamen solve the technical problems underlying this feat? A handful of men on the giant's head could not hoist a five-ton stone cylinder to their own level, nor mount it on the point upon which they stood; nor could a crowd below push this large stone up some five times their own height. Skottsberg (*Ibid.*) measured one of these head-stones from a fallen statue: it was roughly twenty-three feet in circumference, six feet high and over eight feet in diameter.[1]

It is an unfortunate fact that the "mystery" of the Easter Island statues has had more appeal to the common public than to the Pacific archaeologist. Not counting general text-books, encyclopedias, and travel descriptions, more papers have probably been devoted to Polynesian string-figures and marriage customs than to the prehistoric background of the anthropomorphic monuments on Easter Island. These vestiges, the most conspicuous and unchangeable in the Pacific island world, have played a decidedly secondary role in the efforts to reconstruct the Polynesian origins and migrations.

The absence of an authoritative answer to the Easter Island problem, generally replaced by an unconvincing theory of local evolution, has encouraged many general writers to propound the most unreasonable explanations. Recently the daily press devoted serious attention to a suggestion (Wolff 1948) that the extinct volcano underneath the quarries erupted at convenient intervals and was used by the sculptors to blow the brittle statues feet foremost to their destinations. And even to-day serious contributors to Polynesian literature include those who cling to the belief that Easter Island may be the topmost peak of a richly populated sunken land, the statues having been moved by the masses up towards the peak as the island was gradually being submerged. (Reche 1926.)

If the Easter Island achievement is impressive enough to encourage such theories in our own day in attempts to see how the statues were handled, how less likely is it that the methods would have come naturally to a few canoe-loads of local natives, or to any who were not already initiated into the art before arrival. Furthermore, we may certainly take it for granted that there was hardly a choice of methods available to these early stone age people, and we may therefore be justified in assuming that the unknown architects who abandoned the colossal Tiahuanaco megaliths and human statues were probably familiar with the same neolithic methods.

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[1] See also Routledge 1919, p. 199.

The entire cult site of Tiahuanaco is left as a jumble of carved stones, some of them being stupendous slabs of great size, far heavier than any of the monuments transported on Easter Island. The weight of the Easter Island statues is generally estimated, according to size, at from ten tons to upwards of a hundred tons. The most moderate figures are given by Métraux (1940, p. 304), who doubts whether the weight of any of the erected statues exceeds 30 tons. This estimate is a little too cautious perhaps, as it would almost mean that the most bulky of the statues would be able to float on water. The aforementioned statue measured by Skottsberg on an *ahu* far from the quarries and near the landing place at La Pérouse Bay must have a volume of about 30 cubic metres, and if weighing no more than 30 tons it would have the density of 1, like pure water.[1] But Métraux, quoting Delacroix and Wentworth, shows that the density of the Rano-Raraku tuff from which the statues are made is 2.48, which would give a statue of 30 cubic metres a weight of roughly 75 tons.

Technical achievement of megalithic transportation from Tiahuanaco and northwards

Now, in Tiahuanaco carved and erected slabs of forty or fifty tons are found everywhere. Bennett (1934, p. 440) excavated, besides the bearded image, another and larger stone human figure which was 25 feet tall, and the same author (1949, p. 186) says of the Puma Puncu group of megaliths, also at Tiahuanaco: "It is built of great slabs and stone blocks, some weighing over one hundred tons. ... The nearest source of the sandstone used in this construction is over five kilometers distant."

The Tiahuanaco megaliths quarried and transported for some distance include specimens which are thirty-six feet long and seven feet wide; twenty-five feet long, fourteen feet wide and nearly seven feet thick; etc. (Mozans 1911, p. 190; Posnansky 1914; Verrill 1929, p. 269; Steward 1946, p. 112.)

As Mozans (1911, p. 192) shows, as far back as the 16th century Cieza de Leon measured some of the titanic stone blocks of Tiahuanaco and was most impressed on finding that in the whole district there were no quarries whence the numerous great stones could have been brought. Mozans adds: "This same fact has equally impressed all subsequent investigators. So far as is known, there is no sandstone similar to that occurring in the ruins to be found nearer than fifteen miles, while the nearest place at which trachyte and basalt can be procured is Copacabana, which, in a straight line across the lake, is forty miles distant.

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[1] Skottsberg (1920, p. 9) gives the dimensions of this statue as follows (it had been willfully undermined and made to fall from its *ahu* by island tribes without any respect for those who formerly created these monuments): Total length 10.27 m; length of body 6.55 m; length of head 2.52 m; length of neck 1.2 m; width of body at base 2.7 m; thickness of body at base 1.6 m; width across shoulders 3.2 m; width across head 2.6 m; width across neck 1.9 m; circumference round shoulders 7.9 m; circumference round neck 5.2 m; length of ear 2.4 m.

How were the immense monoliths used in these structures transported for such distances?"

Spence (1913, p. 250) wrote: "Other remains of these prehistoric people are found in various parts of Peru. At Sacsahuaman, perched on a hill above the city of Cuzco, is an immense fortified work six hundred yards long, built in three lines of wall consisting of enormous stones, some of which are twenty-seven feet in length."

At Ollantay-Tambo, forty-five miles north of Cuzco, is another giant fortress "constructed for the most part of red porphyry, and its walls average twenty-five feet in height.—The stone of which this fortress was built was quarried at a distance of seven miles, in a spot upwards of three thousand feet above the valley, and was dragged up the steep declivity of Ollantay by sheer human strength."

With regard to these two latter megalithic constructions it is interesting to note that, according to Means (1931, p. 137), the northern wall of Sacsahuaman (the fortress of Cuzco), and some walls of Ollantay-tambo also, seem to be pre-Inca and of Tiahuanaco type. Bingham (1948, p. 4) has estimated the weight of the stones in this particular Sacsahuaman wall, and, for the smaller blocks, reckons ten to twenty tons, and for the larger ones two hundred tons; a few of the largest, three hundred tons. Yet these colossal blocks, which far exceed anything handled on Easter Island, have been dragged to the site, superimposed and fitted together perfectly without the use of cement.

Since Means has suggested that this impressive northern wall of the Cuzco fortress is pre-Inca and of Tiahuanaco type, we may well recall what Andagoya (1541-46, p. 55) says the Inca owners of the fortress told the arriving Spaniards. They claimed that "the edifices of Cuzco and the fortress, which is made in a wonderful manner" were originally built by an immigrant Viracocha lord who was "a white and bearded man, like a Spaniard." (See Part V.) Also the anonymous Chronicler cited by Bandelier (*Ibid.*) narrated that it was a certain Viracocha, a man who was shrewd and wise and said he was a child of the sun, and who had come forth from Titicaca and made himself chief over the long-ears, who raised the Cuzco stone constructions, including the local fortress.

We recall with Rowe that the pre-Inca level of Cuzco shows archaeological affinities to the Titicaca basin with Tiahuanaco in the south, and to Chavín in the north. Hutchinson (1875, p. 453) wrote from Chavín even before the site was excavated: "The first of its remarkable antiquities is a bridge over the river Chavín. This is made of three large stones of granite brought from a great distance, as all the geological formation of the neighbourhood is of sandstone... One is confounded at trying to guess by what mechanical appliances a granite stone, nearly twenty feet long and a foot and a half wide,[1] could be transported over these mountain heights."

To carry the comparison of these megalithic achievements back to the jungles of early Southern Mexico, we may again quote Stirling concerning his "Olmec" finds. He describes a number of monoliths representing human heads resting on stone platforms, and measured one of these giant heads at 14 feet high, 7 feet wide, and weighing about 50 tons. He wrote (1940, p. 333): "Most of these stones are large and heavy. We were assured by petroleum geologists in the region that no igneous rock of the type from which these monuments were carved exists at any point closer to the site than 50 miles. How were these immense blocks of stone moved this long distance down rivers and across great stretches of swamp to the location where they now rest? Certain it is that the people who accomplished this feat were engineers as well as artists."

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[1] The longest of the three measured 6.50 m, or 21 feet 3 inches. (*Ibid.*)

There is no local legend to tell us who erected these gigantic stone heads, but it was in the area of these same monoliths that Stirling (*Ibid.*, p. 327) uncovered a stele on the back of which he found the relief of a face belonging to a "remarkable handsome individual with an aristocratic aquiline nose and a curious long, flowing beard." The appearance of the latter figure was such that it was nicknamed "Uncle Sam" by the expedition. (*Ibid.* See Plate XXII **3**.)

If the first Easter Islanders came from the east, as the first local king was actually said to have done by the mixed aboriginals of the island (see Part IV), then they came from the direction where all these prehistoric peoples of Southern Mexico and the Andes had lived—experts in carving and transporting stone heads, anthropomorphic stone statues, and other colossal monoliths. It would not then be surprising if the maritime discoverers of Easter Island climbed the Rano-Raraku quarry near the east coast and began boldly and confidently to carve anthropoliths out of the solid rock with the intention of moving them about the island to planned destinations.

The probable procedure of megalithic work on Easter Island

We have seen how the Polynesian tribes shared the peculiarity of their great American neighbours in being wholly ignorant of wheeled transportation, although both had paved ways and roads. None of them were familiar with hard metals or machinery. It is obvious then that their transportation achievements were the result merely of the successful application of some ingenious system assisted by ample time and combined muscular power.

It has frequently been maintained that barren Easter Island could never have supported the population required to carry out the work which was done in the prehistoric era of the island. This argument has been based partly on the fact that the local monoliths were not carved and transported singly, for several were under simultaneous construction when the work was abruptly abandoned. As we have seen, in spite of the comparatively moderate number of statues which have been raised on *ahus* in various parts of the island, more than one hundred and fifty monuments in different stages of development were still left in the Rano-Raraku quarries.

Routledge (1919, p. 181) points to this fact in her excellent survey of the island monoliths: "It remains to account for the vast number of images to be found in the quarry. A certain number have, no doubt, been abandoned prior to general cessation of the work; in some cases a flaw has been found in the rock and the original plan has to be given up—in this case, part of the stone is sometimes used for either a smaller image or one cut at a different angle. In other instances the sculptors have been unlucky enough to come across at important points one or more of the hard nodules with which their tools could not deal, and as the work could not go down to posterity with a large wart on its nose or excrescence on its chin, it has had to be stopped. But when all these instances have been substracted, the amount of figures remaining in the quarries is still startlingly large when compared with the number which have been taken out of it..."

Again, as later stressed by Métraux (1940), we must not overlook the fact that quite a large number of the Rano-Raraku statues were actually erected on the inner slopes of the crater, and that there was no intention of moving them away. This reduces even more drastically the number of statues that had been abandoned during the actual work. Since the workmen's niches clearly demonstrate that only a few sculptors could work simultaneously on one monolith, we shall find that the number of sculptors busy in the quarry at the same time was not extremely large. When we next look for the statues abandoned during the actual process of transportation, their number only amounts to two or three. (Routledge 1919.) These indeed, were at the time of their abandonment the only statues which occupied at all a large body of man-power.

Certainly the labour available in Easter Island was very limited when compared with that of the autocratic powers which organized mass labour for megalith transportation in Peru and comparable continental empires. The most optimistic calculation of the population capacity of Easter Island was Edmund's, quoted by Routledge (1919, p. 215), according to which about half the total area of the island, or some 15 000 acres, could formerly have grown sweet potatoes and bananas. Two acres of cultivated ground would be sufficient to supply a local family, with extra food supplies from the sea. There are still traces of prehistoric terrace cultivation on the very hill-tops, and the sweet potato was a very important crop when the island was discovered by Europeans. (See Part VII.) If this estimate holds good, then the Easter Island population must have greatly decreased by the time the Europeans arrived, as Roggeween and the other early travellers did not find any such impressive community. Skottsberg (1921, p. 101) refers to another calculation which shows that Easter Island in a period of high culture could support at least 5 000 individuals. Métraux (1940, p. 14) is still more careful, but feels convinced that three or four thousand natives could have lived on the island without fear of hunger except in time of war. The megalithic work on Easter Island will have to be judged in connection with a local population whose margin is roughly marked out by the above calculations.

There is not much choice as to the manner by which the statues can have been moved. There was not enough space round one unwieldy statue for a number of men to be able to lift it, so the statues must have been dragged along the ground. Since wheeled transportation was unknown, they must either have been pulled over rollers, or else moved along on some sort of lengthwise skids to prevent the heavy monolith from digging itself into the stony ground. The fact that the statues were completed and polished down to the least detail except for the keel on the back *before leaving the quarry* is a clue of some value. A statute could not then be permitted to tip over on its side while passing over the rugged island surface, or the polished parts of the fragile tuff would have been scarred and damaged. It therefore follows as a consequence that during transportation the statue *must* have rested firmly on its back, with its dorsal 'keel' in some sort of a frame to prevent capsizing. This would indicate the use of a sledge-like affair, and we have therefore also a reasonable explanation to the practical problem of how the stone colossi could be dragged over the ground with the *friction* greatly reduced.

It has often been suggested that timber for rollers and transportation would not have been available on the almost treeless Easter Island. Again Skottsberg (1920), as a botanist, came to believe that a forest of *Sophora* and perhaps other now extinct species once grew on Easter Island. Indeed, a great demand for timber and firewood would soon make an end of a forest on so small an island. We have in our own historic time seen how the island of Motane, once covered with dense forest, has been turned into a treeless and deserted stonewaste by the hordes of European sheep and other formerly domesticated animals that have shown no mercy to the island vegetation. (Heyerdahl 1938.) In his approach to the problem of image transportation, Skottsberg (1920, p. 10) pointed out that Thomson (1889, p. 486) discovered near a group of *ahus* a fine landing-place made by art and "admirably adapted to the landing of heavy weights". Admitting that no fragile canoe could float with one of the large images as cargo, he says: "One might suggest that large rafts were built but, on the other hand, there are several ahu which are inaccessible from the shore." Skottsberg came back to what seems to be the only tenable answer to the problem: "Some sort of a sledge-like apparatus could have been constructed without the need of timber of any considerable size. A sledge would slide quite well over the grass, provided that the road was cleared from stones. A great number of people could be simultaneously engaged in pulling, while, if rollers were used, the image must have been more difficult to handle."

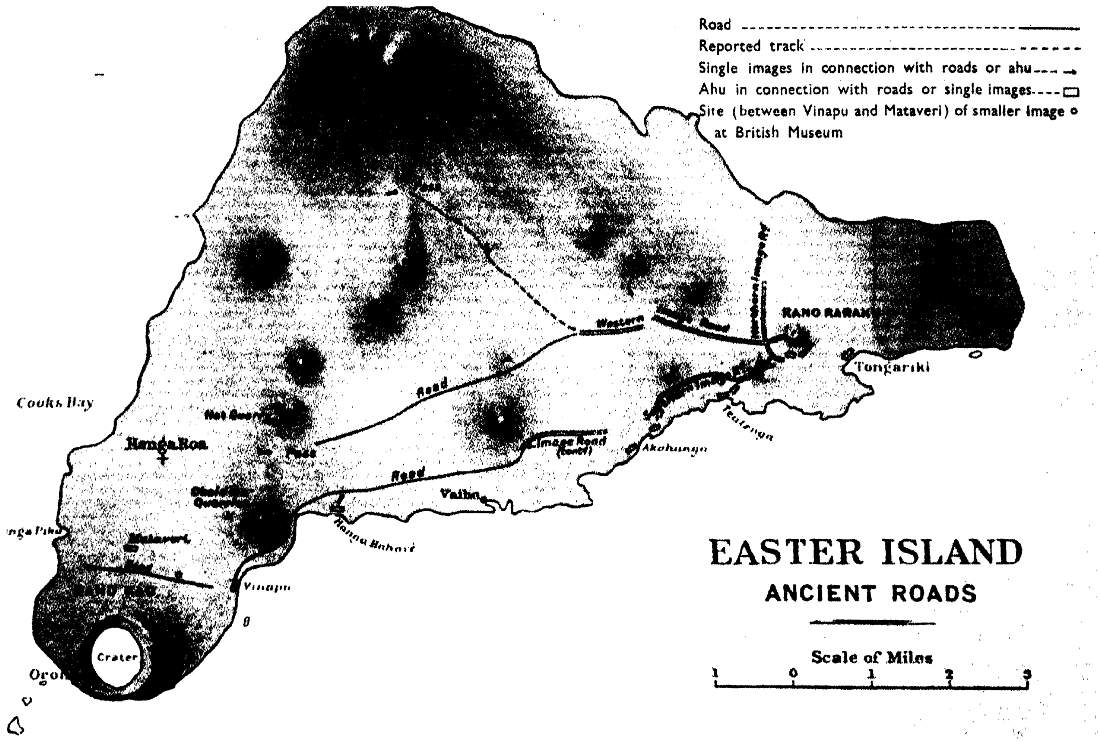
We shall later see that cleared roadsections, which in some cases may have faciliated the transportation of the images, are found over large stretches of Easter Island. It is not incredible that rollers of logs or round pebbles were used underneath the sledge-like frame, and that seaweed and grass (Thomson 1889) or even taro and sweet potatoes were used for lubrication (Métraux 1937 b,p. 134). The Polynesians, even in historic times, have been renowned for their skill in manufacturing all sizes of excellent rope from inner bark and other vegetable fibres, and when the Spaniards came to Peru they found in that country suspension bridges made from cables woven to the thickness of a man's body and with a length exceeding two hundred feet. (Prescott 1847, Vol. I, p. 86, based upon the report of several chroniclers.)

With ropes and a supporting frame, a fifty-ton image could be pulled along a cleared path by some four or five hundred men, more or less according to the gradients and surface conditions. The smaller statues could, of course, be transported with a correspondingly smaller number of labourers. Métraux (1940, p. 305) has shown that other Polynesians have moved weights as heavy or heavier than the average Easter Island statues: "Two 60-ton vessels, blown inland by a hurricane, were carried back to the sea by Maoris. It is said that one was transported by 2 000 men; the other by only 200." He further emphasises that: "The major difficulty in transporting Easter Island images was not the great weight but rather the fragility of the soft tuff. The moving of statues without scarring them is, in my opinion, the greatest achievement of the Easter Islanders."

We have however yet to account for the final achievement of the Easter Island architects: the raising of the statues on to their feet, whether on sunken pedestals or resting on the *ahu* platforms.

The present Easter Islanders have no clear recollection of how this was done. It seems, however, that a tradition surviving among their Polynesian relatives on Tonga may furnish the simple answer. We may quote Métraux (1937 b, p. 134):

"The erection of the famous trilithon of Tonga, like that of the Easter Island statues, has long been a puzzle, and many wild theories have been proposed to explain its origin.



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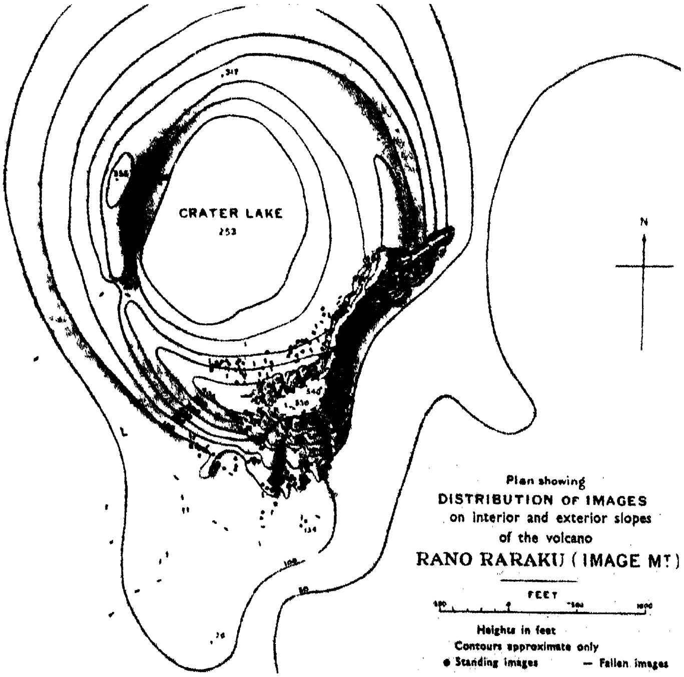

3

Distribution of roads and image sites on Easter Island. **2** A section of the south-eastern aspect of Rano Raraku's exterior with statues and quarries as shown in Routledge's diagrammatic sketch. (From *Routledge 1919*.)

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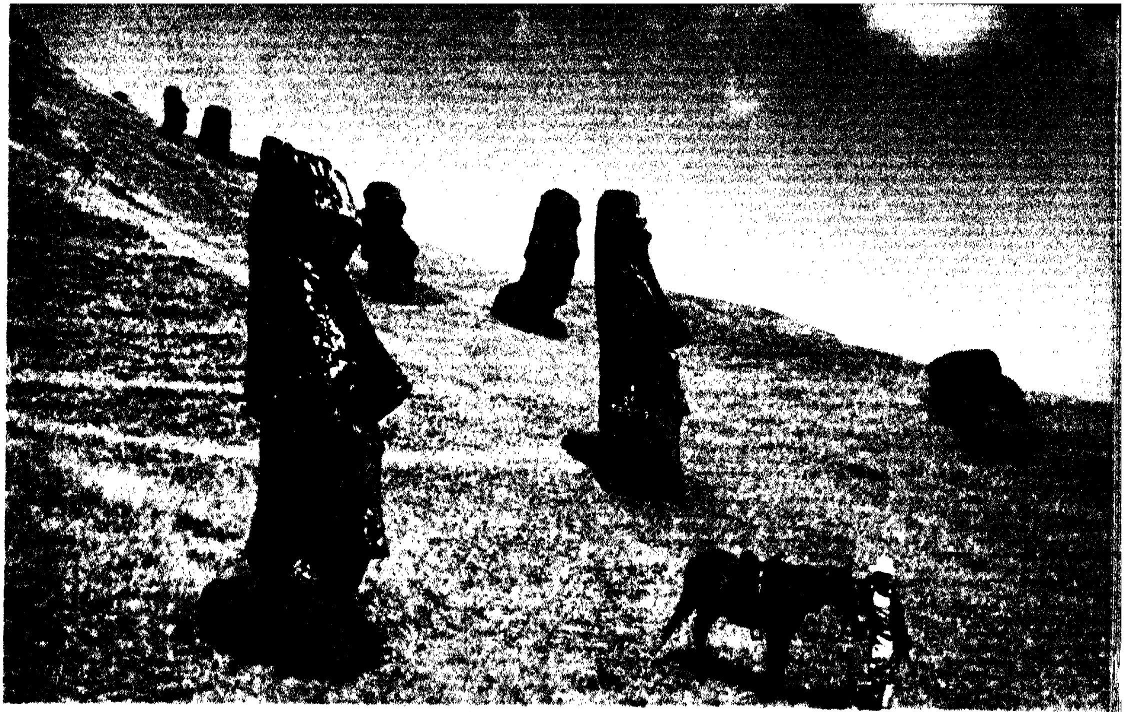
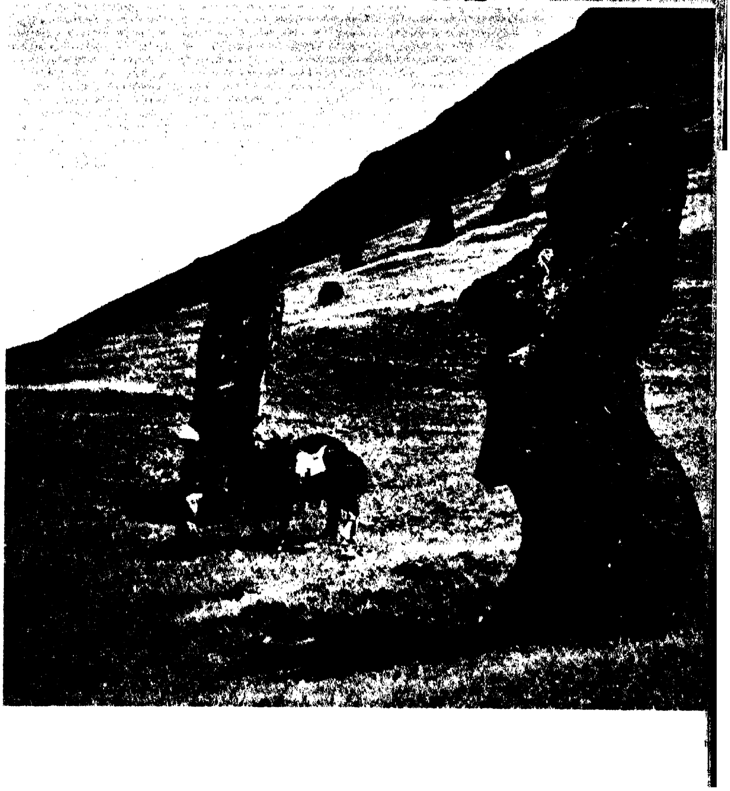


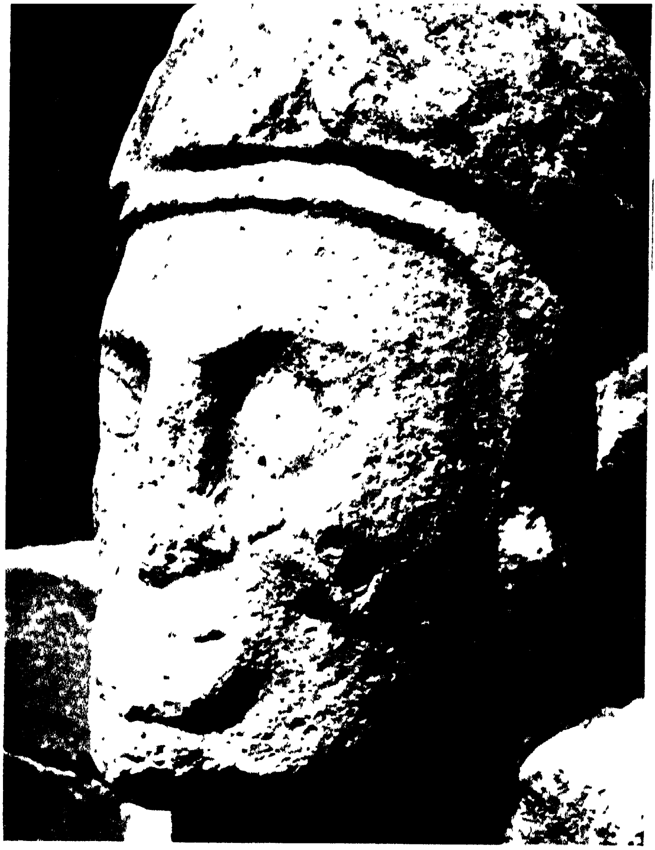
Plate XXXVIII

1 Fallen statues on the slopes of Easter Island. **2** Upper section of 66 feet long stone statue lying unfinished in its niche in the quarry. (Photos: *H. Martini.*) **3** Nearly finished statue still attached to the floor of quarry by a narrow dorsal keel, and **4**, another one, all ready for launching, wedged up by stones. (From *Routledge 1919.*)

Plate XXXIX

Stone statues on Easter Island. (Photos: *H. Martini.*) Monuments of this sort are only found on the Pacific islands nearest South America, and the history of the present Polynesians has preserved no tenable explanation for their purpose or of the way in which they were transported and erected.





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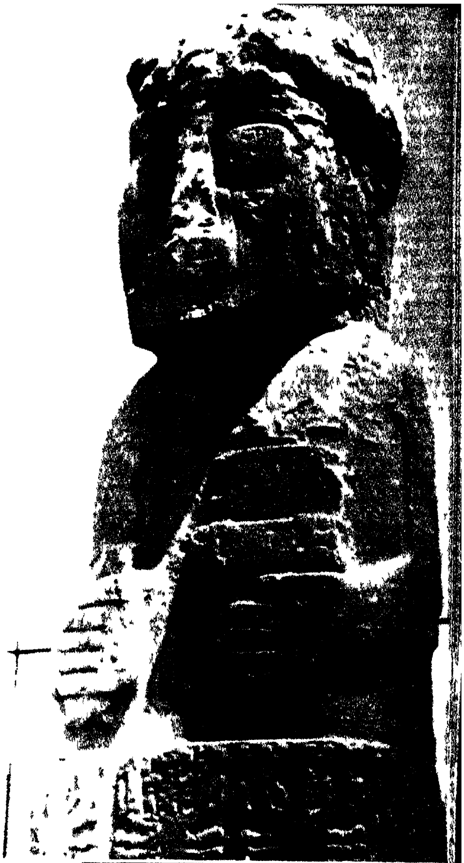

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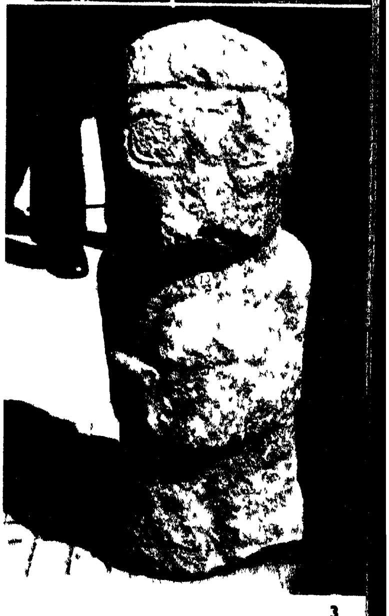

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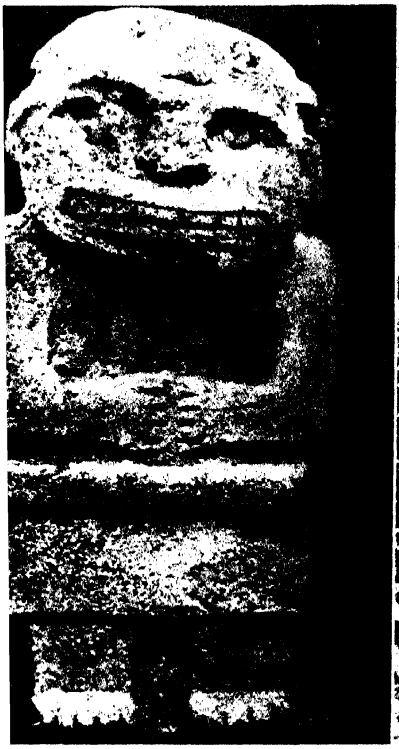
Plate XL

Easter Island stone bust and head. (Courtesy: *The Smithsonian Institution.*) Compare this island specimen with the one from the pre-Inca cult centre at Tiahuanaco illustrated in fig. **1** on this page.

Plate XLI

1 and **2,** stone statues from Tiahuanaco. At this pre-Inca cult-centre the Peruvians considered Tici to have created man before he and his white and bearded followers descended to the Pacific coast of North Peru and left into the ocean. (Photo: *Toucan Press-Wegeesch.*) **3** Reddish sandstone figure from Incatunuhuiri, Peru. (Photo: *Peabody Mus. Harvard Univ.*)



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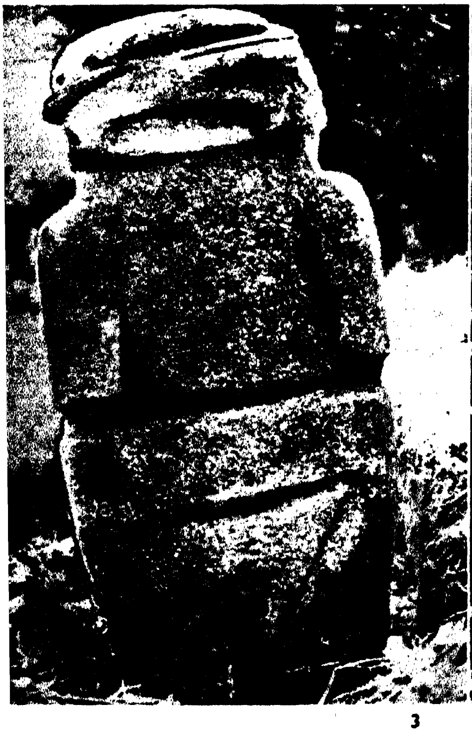

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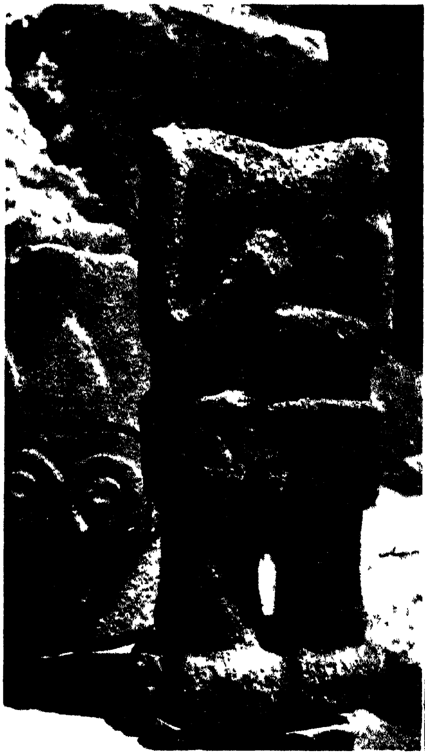
Plate XLII

1 Monolithic statue from the prehistoric cult-centre of San Augustín in the northern Andes, and **3** back view of same. (From *Preuss 1931.*) **2** and **4** Front and back view of monolithic statue from the prehistoric cult-site on the east coast of Hivaoa Island, Marquesas, directly facing the Andean coast at some weeks' distance by raft. (Photo: *T. Heyerdahl.*)

Plate XLIII

Stone human statues **1** from Pukara, Peru (photo: *L. E. Valcárcel*); **2** from the Marquesas Group, Polynesia (photo: *Musée d'Ethnographie, Paris*); **3**, **4** from the Tubuai Group, Polynesia. (Photos: *B. P. Bishop Mus. Honolulu.*)



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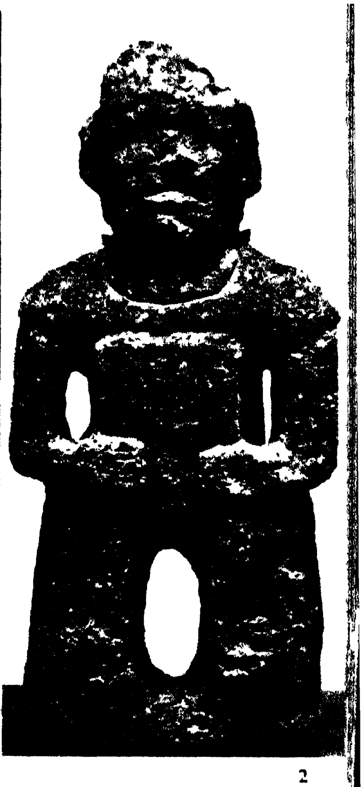

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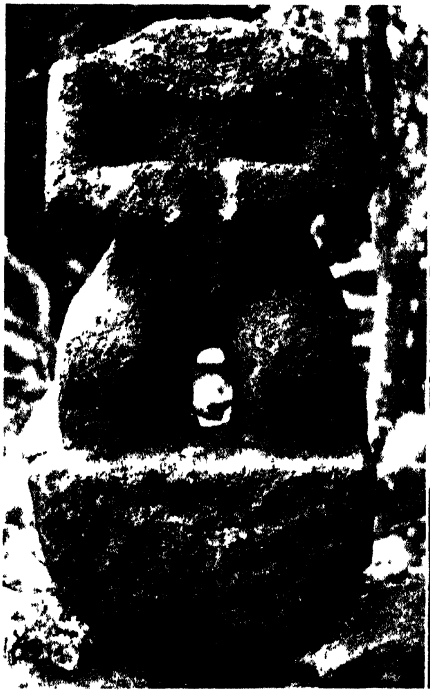

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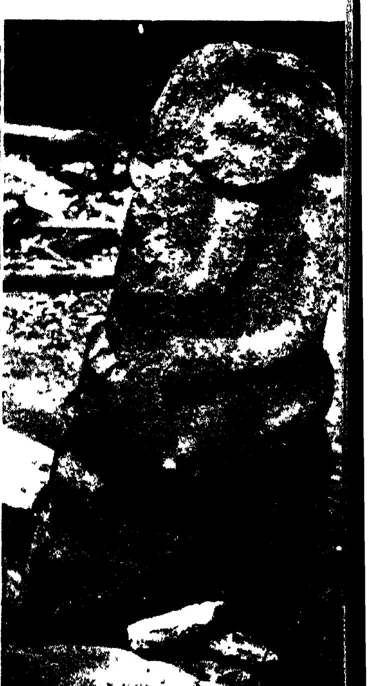

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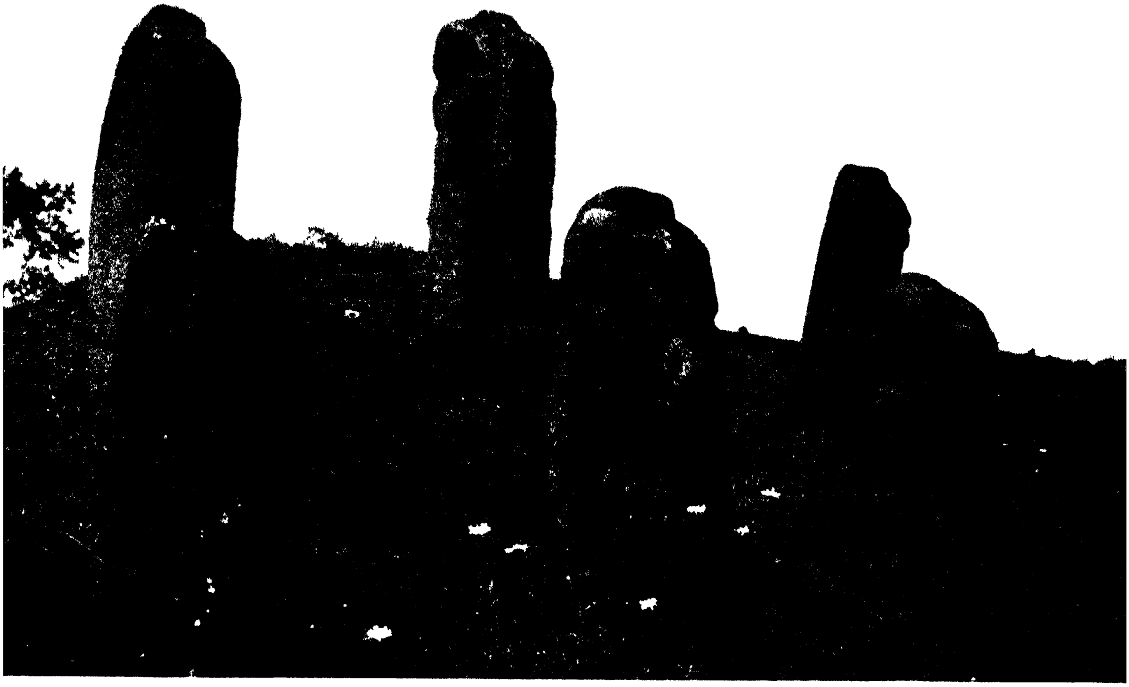

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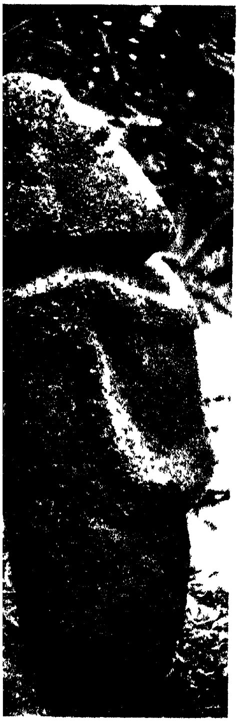

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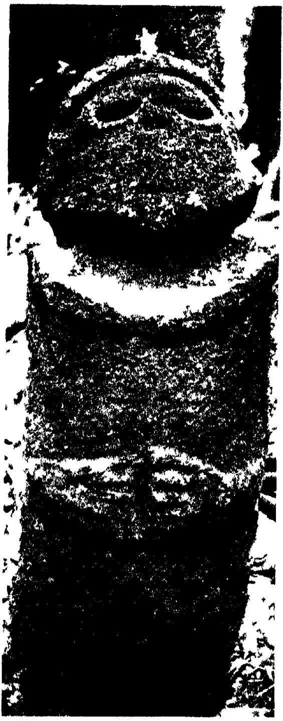

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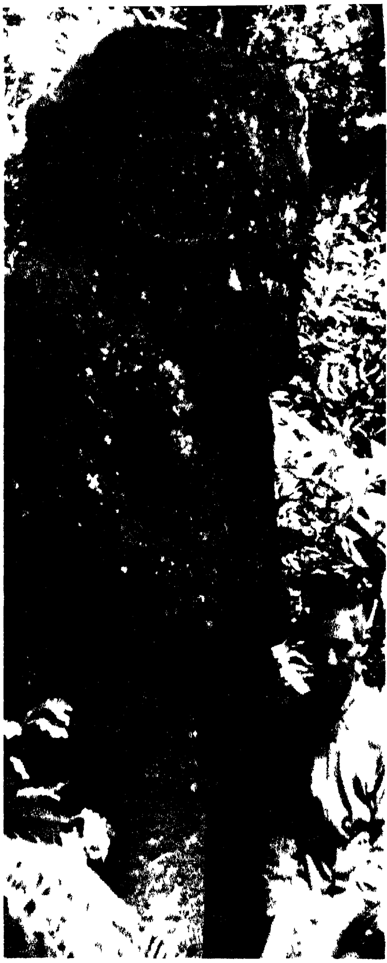
Peculiar type of stone statue **1** from San Augustín in South America (photo: *John Costa, Black Star*), and **2, 3, 4** from Raivaevae in southeast Polynesia (photos: *B. P. Bishop Mus.*).

Stone human statues from South America and East Polynesia. **1, 4, 5** from the Marquesas Islands. (Photos: *T. Heyerdahl.*) **2** Tiahuanaco. (From *Posnansky 1914.*) **3, 6** San Augustin. (From *Preuss 1931.*) Tiahuanaco statue **2** is earlier (plate XLI **2**) compared with an Easter Island statue, and bridges the gap in style between the distinct Polynesian forms found respectively on Easter Island and in the Marquesas Group.



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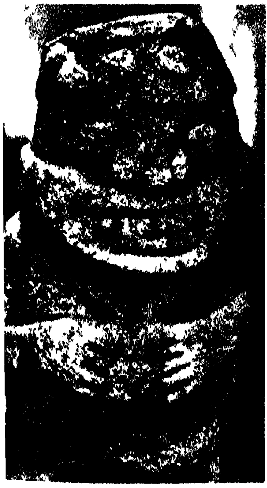

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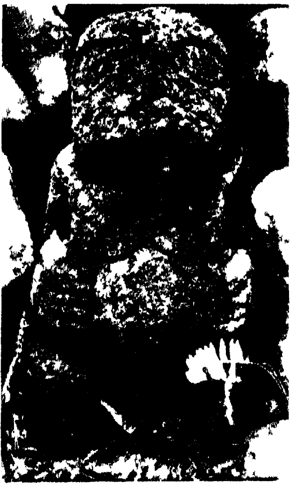

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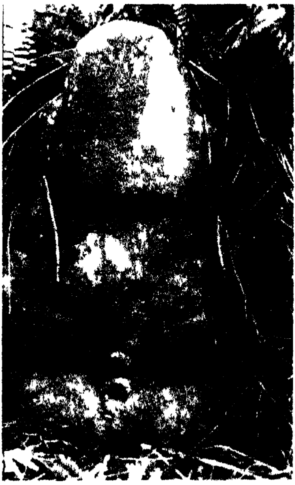

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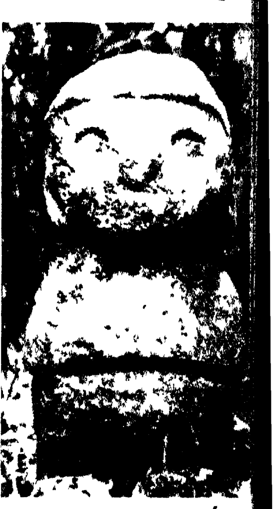

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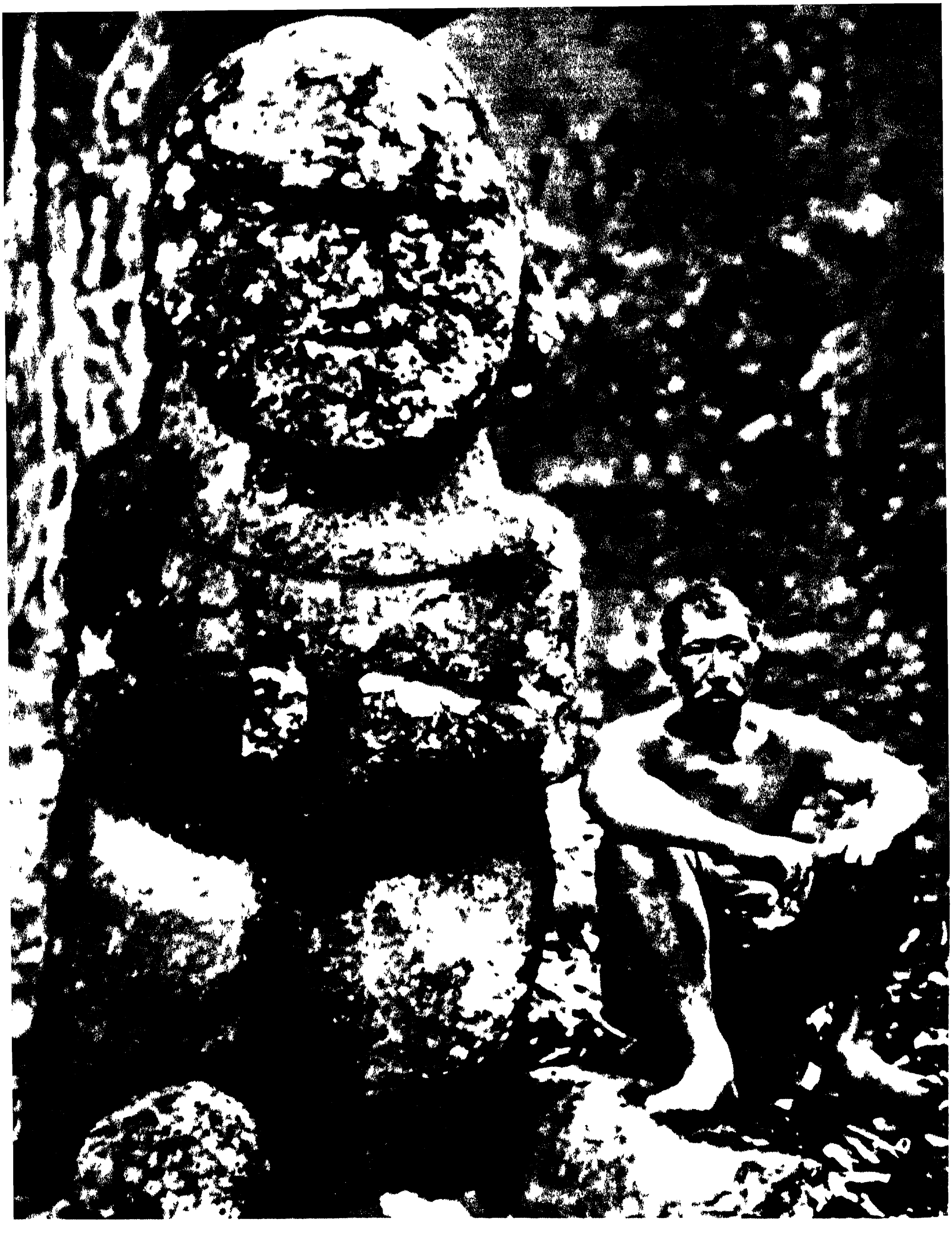
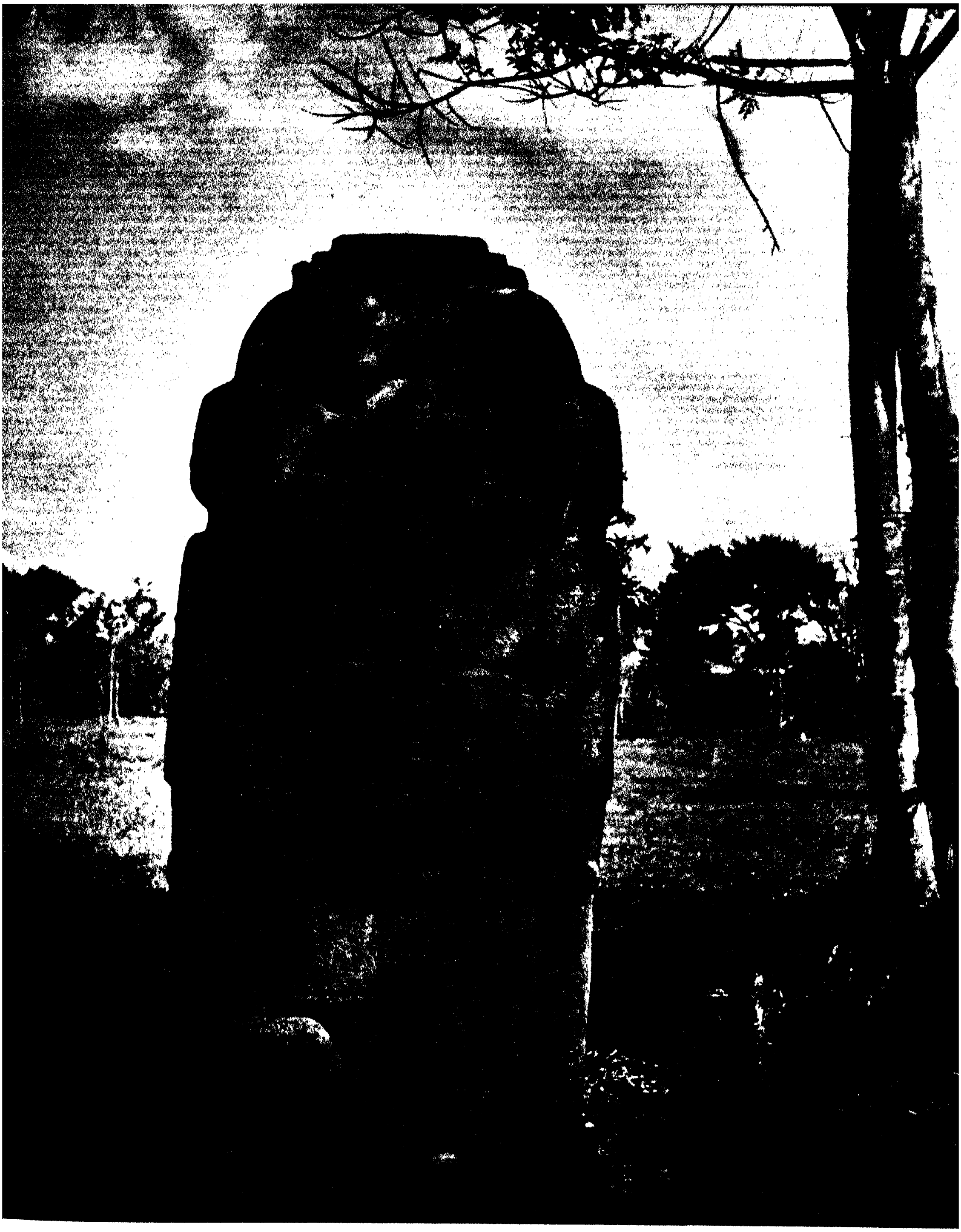
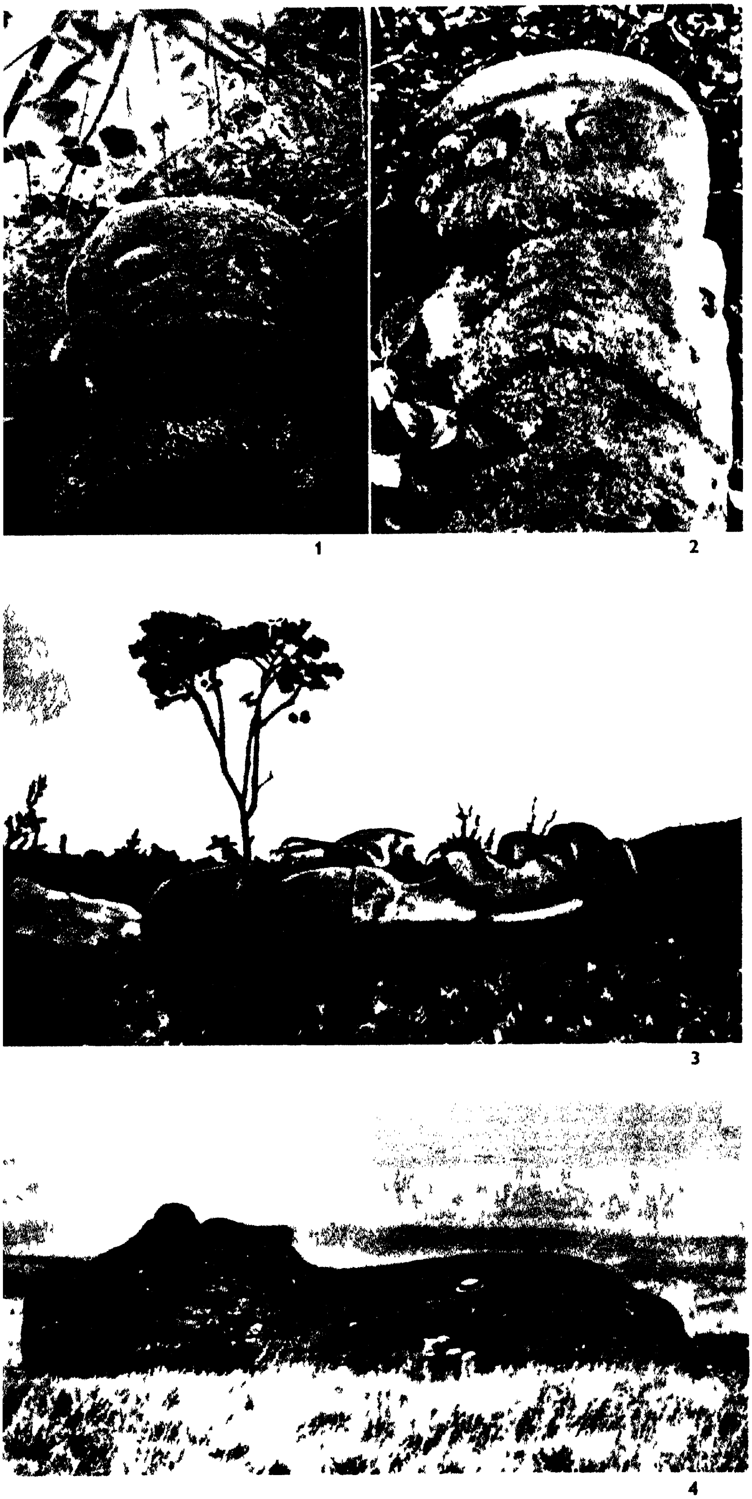


Monolithic statue from Raivaevae, the Tubuai Islands, Southeast Polynesia. (Photo: *B. P. Bishop Mus.*) Note relative proportions of head, body, and legs, as well as position of hands, and compare South American figure on opposite page.



Monolithic statue from San Augustín, Colombia. (Photo: *John Costa, Black Star.*) A vast number of large and small stone human figures are left by an unidentified prehistoric culture people at this deserted South American cult-site.



South American and East Polynesian stone statues. **1** San Augustín, Colombia. (From *Barradas 1943.*) **2** Nukuhiva Island, Marquesas. (From *Freeman 1921.*) **3** San Augustín. (From *Barradas 1943.*) **4** Easter Island. (From *Routledge 1919.*)

Mac Kern obtained from an old Tongan a detailed and logical account of the method used. As it is probably similar to that resorted to by the Easter Islanders for erecting their statues, it is worth mentioning here.

"The pillars which weighed between 30 and 40 tons were quarried near the shore. 'When they were shaped they were dragged over wooden skids, by means of heavy ropes and the combined muscular power of many men.' Close to the pits where the columns were to stand, an earth incline was built with a retaining wall of trees and brush. The stones were dragged to the edge of this mound and were then nicely balanced and carefully guided by ropes to fall endwise into the pits. The same method was employed for the lintel. The earthern incline was removed, leaving the trilithon in position. Other than the wooden skids and the ropes, the only implements used by the Tongans were blocking wedges and levers."

This is most interesting, for this procedure is identical with that used in early Peru, concerning which Rowe says (1946, p. 226): "Stones too big to be carried were moved on rollers with the aid of wooden pry bars and large crews of men pulling with ropes. The blocks were raised into position by building a ramp of earth and stones up to the height of the wall and running the blocks up on their rollers. Cobo saw this technique used by Indian workmen employed on the construction of the Cuzco cathedral, and a half-finished chullpa at Sillustani in Puno has such a ramp still in place."

Montesinos (1642, p. 19) also, when describing the legendary procedure of the megalith work on walls at Cuzco in pre-Inca days, says that the quarrying was done "with picks and axes made of stones from rivers and filed as if they were made of steel. . . . They had no derricks with which to lift the stones into place, so they used this device: They banked the earth at a moderate angle up to the top of the newly completed first tier of stones; then, with human force, they carried up a second tier, rolling the stone over and over, however large it might be, and they adjusted it to the wall very slowly and accurately."

The possibility that the ancient Easter Islanders made use of this same simple but most ingenious method is strengthened by the fact that it was also employed by the megalithic workers in the early Marquesas. Both Linton (1925) and the present author were informed by the aborigines of central and south Marquesas that according to tradition a temporary ramp of pebbles had been raised against the face of the megalithic masonry to allow the giant blocks of the upper levels to be hauled into position. A quite analogous working method would allow the Easter Islanders to pull their stone giant feet foremost up a temporarily constructed ramp, and then tip the colossus over the steep side into a foundation-hole dug in the ground below, or else down upon the pavement of the *ahu*. The presence of such a temporary embankment might even have encouraged the Easter Islanders to accomplish their final feat, namely to drag up an extra stone and place it carefully on top of the statue before the ramp against its back was removed.

The significance of the red pukao on the head of Easter Island statues

To-day all the statues which formerly stood on the pavement of the *ahus* have fallen, but at the time of the early voyagers some at least were still standing. Cook (1777, Vol. I, p. 281) wrote from Easter Island: "Each statue [on the *ahu*] had on its head a large cylindric stone of a red colour, wrought perfectly round."

To-day these red blocks lie on the ground beside the fallen grey giants whose heads they formerly ornamented. We can safely say that hardly anything but an embankment of the sort already described could have brought one of these summit-stones to its place on the head of a statue. One of these stone cylinders—which are popularly called image "hats" —was measured by Skottsberg (1920, p. 9) as 2.5 m (8′2″) in diameter and 1.85 m (6′1″) in height, with a volume of 9 cubic metres, and a weight, therefore, of more than twenty tons. This "hat" was lying beside a fallen figure, and the author describes the remains also of a sort of stone wall on the *ahu* close beside the statue. He asks: "Could it not be possible that the stone wall spoken of above was part of a construction on which the hat was to be rolled up to the top of the image?"

There may also be a fragment of memory in a tradition collected by Routledge (1919, p. 197) in respect of a lofty image which formerly stood on one of the *ahus*. Pointing out a hillock near this particular platform, her native informant said that once "a causeway was made from it to the head of the tall figure which stood upon the ahu, and along this the hat was rolled."

A temporary stone ramp or embankment high enough to tip the statue into position was fully within the capacity of a people which had time and labour sufficient to work on more than one statue at a time. And while the embankment was still in place against the back of the statue, it must have been a temptation to use it, before removal, for the hauling of an extra stone to the top of the first. But this does not explain why the sculptors went to another side of the island to secure a special reddish rock for the upper cylinder. There was a special quarry for these reddish top-stones at Punapau, about seven miles from the image quarry at Rano-Raraku. The cylindrical "hats" measured from six to nine feet in diameter and from four to eight feet in height; they had an oval depression below and were cut with a distinct knob on the top. Only statues raised on the sacred *ahus* were distinguished in this manner, and Métraux (1940, p. 301) thinks it was a secondary idea not practised right from the beginning.

A few half-buried "hats" remain in the "hat quarry" at Punapau, and a great number of others are strewn along the path leading down from this quarry to the foot of the mountain. As distinct from the images, these top-stones were transported—probably rolled—as mere cylinders to the sites of the giants on whose head they were to rest. Not until they arrived were they given their proper shape with the characteristic round boss or knob at the upper end. (See Plate IL.)

The problem behind the emphatic choice of a reddish stone for the giant "hats" on the otherwise nude statues may take an interesting form when we recall the venerated reddish hair of the *uru-kehu* individuals which existed sporadically on Easter Island and throughout most of Polynesia. (See Part IV.) Balfour (1917, p. 369) was the first to suspect that the red top-stones on the Easter Island figures were not meant as "hats". In his noteworthy paper "Some Ethnological Suggestions in Regard to Easter Island" he says:

"Lastly, in connection with these statues, I have a suggestion to make in regard to the so-called 'hats', or 'crowns'. These, as I have already mentioned, are huge cylinders of red volcanic ash or tufa, which were placed on the tops of the heads of some of the effigies. Now, if these merely represented hats or other head-gear, it is difficult to see why the natives did not carve them out of the rock in one piece with the statues. That would have been an easy and obvious method of arriving at an adequate result where only a hat was intended. Why, then, did they take the trouble to go nearly across the island to another crater in the Teraai Hills in order to employ as material for the 'hats' a special kind of very *rough* rock, a vesicular *red* tufa?

"I wish to urge as a tentative and heterodox suggestion, that the reason was that these red cylinders were not intended to represent hats at all, but hair. . . . a *red* tufa was selected in order to conform with the practice, common enough in Melanesia, of bleaching the hair to a reddish colour with lime, or of coating it with red ochre."

Later Métraux (1940, p. 301) took up the same problem. He quotes Jaussen, who at an early date learned that the Easter Island term for the red image 'hats' was *pukao*, and adds: "The original meaning of *pukao* is topknot. The cylinder with a knob may have been an attempt to represent the long hair tied up on the head in a big knot (*pukao*), a fashion very common on Easter Island. ... More interesting is Skinner's comparison of the Easter Island image hats with the cylindrical representation of the topknot on the heads of ancient figures in Maori carving. ... The theory that these crowns were merely a crude attempt to ornament the statues with a structure similar to a topknot (*pukao*) is the most logical assumption."[1]

We have seen how the black-haired Polynesians in many of the islands imitated the natural hair colour of the *uru-kehu* by plastering or painting their own hair red. Stephen-Chauvet (1934, p. 18) gives the following description under the heading "male coiffure" on Easter Island: "Formerly the Easter Islanders always walked about bare-headed; their hair, regularly cut above the ears (A. Pinart), was artificially rouged and united in a topknot on the summit of the head, by the aid of plant fibres and a coating of mud."

The Caucasoid elements and the Easter Island statues

We now come to a vital point. These islanders plastered their hair red to imitate some ideal of beauty. This ideal of beauty was not merely a product of the imagination, since it was locally inherited through strains of naturally red-haired *uru-kehu*. Is it not probable, then, that the Easter Island statues directly depict this early red-haired ideal? May they not represent ancestor-portraits of chiefs and heroes of this venerated appearance?

G. Forster (1777, p. 575) wrote in reference to the Easter Island statues, during his visit with Captain Cook: "We put some questions to the most intelligent persons among them, concerning the nature of these stones, and from what we could understand, we concluded that they were monuments erected to the memory of some of their areekees [*arikis*], or kings." J. R. Forster (1778, p. 567) was also told that the statues represented former chiefs, or 'hareekees'. Cook (1777, Vol. I, p. 296) himself noted that the Easter Islanders had preserved the individual name of some of the statues, and that the word *ariki* (chief) was added after each name. We may thus safely assume that the Easter Island statues represent no elementary powers or supernatural beings, but were raised as ancestral figures exactly like the monuments of Tiahuanaco and Pukara.

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[1] Routledge (1919) has shown the direct connection between the statues and the so-called 'bird-man' cult on Easter Island. Now, another name for the *pukao* or 'topknot' of the Easter Island statues was *hau*. The ceremonial 'bird-man' for the year, upon whom the divine choice fell, was also called *hau*, yet he wore no 'hat' but had instead "a fillet of human hair bound round his shaven, red-painted head." (St. Johnston 1921, p. 140.)

The Easter Island statues, carved in the image of the *arikis* or chiefs of the early local culture-people, have a great deal to tell us, when we recall (Part IV) that the first Easter Island *ariki* was Hotu Matua, who came from a sun-dried land, in the same direction as Peru, with long-ears among his followers. The statues not only depict such long-ears—the most noteworthy distinguishing mark of the royal families in aboriginal Peru—but they also embody a monolithic art-form most important in aboriginal Peru, and assigned by the Inca to Tici Viracocha and his adherents, the same hierarch who instituted the ear-lengthening custom in the pre-Inca period. Furthermore, in Peru these departed heroes were remembered as having a physical appearance resembling Europeans; they were *Viracochas*, just as J. M. Brown (1924, p. 236) writes from his visit to the island: "There is a general consensus of the European-like features and colour of many of the natives of Easter Island. And the faces of the images confirm this Caucasoid impression; they are oval, straight-nosed, large-eyed, thin-lipped and short in the upper lip, the features that distinguish or are supposed to distinguish the highest ideal of beauty of the north-west of Europe."

Many observers have commented on the enormous chins of the Easter Island statues, drawn out in length and width to terminate in a broad and sharp edge. When we look carefully at Thomson's drawing (1889, p. 493) of a back view of the general type of statues at Rano-Raraku (see fig. b p. 373), we cannot help noticing that no ordinary "chin" so projects on both sides that it is visible from behind. We may, therefore, look again at the profile view (fig. a), and find that whereas on an ordinary face the distance from mouth to chin is normally twice the distance from mouth to nose, on the Easter Island statues it is three times that distance. If we shade or remove the part of the chin which is thus added to what would be a natural form, then we get the pictures shown below in c and d. It seems fairly evident that the sculptors of these stone faces intended the extended lower face to represent a bearded chin. This view is strongly supported by the other ancestral figures on the island. The smaller statues (*Moai kavakava*), carved in wood, invariably have readily distinguishable goatees on their chins, together with extended earlobes. (Plate XXVIII **3, 4.**) This fact has been pointed out by Métraux (1940, p. 251); and Routledge (1919, p. 269) found that three or four of the stone statues inside Rano-Raraku show the same form of goatee beard as carved on these wooden images. She also speaks of three stone heads carved in relief on the wall of a local subterranean chamber: "The one which was best wrought was twenty inches from the surface of the wall; it had a pronounced 'imperial'." (*Ibid.*, p. 275.)

We recall that the Tiahuanaco statue which had the lightning rays running around the forehead and into the eye-brows and beard, was carved, like its Mocachi counterpart and many other Andean monuments, from a selected reddish sand-stone. We suggested that the symbolic interpretation was that the growth of hair on the bearded person depicted was light or flame-coloured. There was no other way for the sculptor to indicate this peculiarity since the whole statue is sculptured in red rock. If the Easter Islanders shared progenitors with this particular Tiahuanaco stock, which seems borne out to some extent by the fact that the present natives in both localities begin their genealogies with the kings

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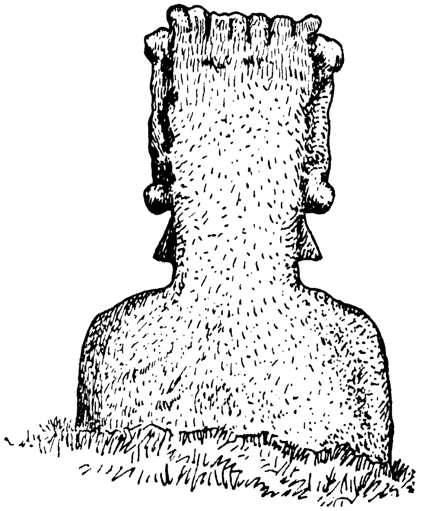

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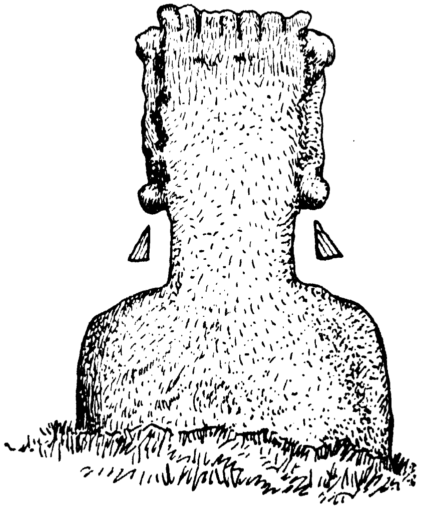

d

Tiki and Tici, then these fundamentally related sculptors have only chosen two distinct means of representing the same reddish or flame-coloured hair. It should not be so surprising then, that just such hair is found on the ancient mummies of the early "burial grounds" on the South American coast between Tiahuanaco and Easter Island.

Typological distributions of Andean-Polynesian stone statues overlap without regard to present race-pattern

We have seen earlier how several writers show that the remarkable Easter Island custom of erecting large stone human effigies bears a strong general resemblance to a characteristic trait of the Andean high cultures on the nearest continent up wind. Many casual observers have been compelled to notice that this resemblance is not one of idea only, but also of general execution. Enock (1912, pp. 262—278) quotes Wallace, who compared the Easter Island statue in the British Museum with some of the pre-Inca statues from the Andes, and then said "I was greatly struck by the resemblance..." Referring furthermore to one of the principal Marquesan stone statues, he held: "... there is an air about this image which seems reminiscent of the stone figures of Tiahuanaco, on the Andean highlands of Titicaca."

The experienced Pacific traveller Christian (1924 a, p. 525) was struck by the same resemblance and expressed the opinion that the Easter Island monuments "exactly recall" those of Tiahuanaco.[1]

Another traveller from both these areas, J. M. Brown (1924, p. 268), also pointed out the resemblance of the work inside the Rano-Raraku crater to that of the stone-carvers of Tiahuanaco, and says of the corresponding stone statues at Raivaevae, in the Tubuai group south of Tahiti: "Their faces are human, but grotesquely human, quite unlike the great stone images of Easter Island, ... They have more likeness to the great stone busts that have been taken from the ruins of Tiahuanaco and set up on each side of the gateway that leads to the church."

Ojeda (1947, p. 11) after his long local residence, wrote in his monograph on Easter Island: "The statues and monuments of stone, which have been claimed to be mortuary sanctuaries intended to perpetuate the memory of the sacred chiefs of the island, present an obvious analogy to the stone cultures of Central America and Tiahuanaco. This is the basis for our belief that their makers are branches of a stock of people common to America and Easter Island."

St. Johnston (1921, p. 81) was so emphatic about the same resemblance that he published illustrations of three comparable statues and wrote: "... the stone images and platforms in the Austral Group [Tubuai], Pitcairn Island, and the Marquesas are very like those of Easter Island, and still more so like those of Peru. ... the long ears, protruding lips, short arms, position of the hands, and stunted legs in the three illustrations I give from the Marquesas, Easter Island, and Peru are absurdly alike, except that the island ones are naturally more primitive and crude than that of the mainland."

When we compare the Andean and East Polynesian monoliths reproduced on various pages of the present work, we cannot deny the assertion that there are as many resemblances between certain Andean and Polynesian anthropoliths as there are between individual statues inside Polynesia or inside Peru, and often more. We are getting back to the same observation we made when dealing with the various sites of the early Andes: each geographical locality has often developed its own distinctive style, which will generally be special to its own place or period. Yet the same basic conceptions and mutual inspirations are ever-present, adapted only to local taste and secondary convention. In this respect the Polynesian stone statues can only be divided from those to be found from Mexico to north-western South America by reason of the ocean between, whereas the American specimens are united by land. This is a deceptive observation, for an ocean drift from Peru to Polynesia is faster than any migration down the Andes (300 miles a week according to the Kon-Tiki expedition), and apart from this the Easter Island statues are slightly nearer to the coast of Peru than to their next nearest "neighbours" in the Marquesas. We can distinguish between most of these stone statues to-day only because we are accustomed to find them in their specific localities. If the Polynesian statues had originally been found in some extinct South American centre instead of some weeks travel out at sea, they would have created no wonder but have been accepted as just another local manifestation of the early American megalithic culture. The statues vary so much in form and type—whether after different models, by different artists, or in different periods—within the Titicaca area, or within San Augustín, that an attempt by the islanders to copy the Andean statues from memory would leave a wide range of possibilities.

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[1] Knoche (1914, p. 2) had a decade earlier, in a rather sweeping statement, denied the slightest resemblance between the stone statues of Tiahuanaco and Easter Island. (See for comparison Plates XL and XLI 1 of present work.)

No exact replica of Easter Island statues exist elsewhere—certainly not among the statues raised on the nearby Polynesian islands. In style and expression it is a local creation, but in idea, working method, and basic conception it is a result of cultural inheritance from an outside and continental evolution area. As already stated, there is no evolutionary thread behind the Easter Island giants. There has been, from the first attempt, a clear conception in the artist's mind of what he wanted to do and how he was to go about it. Among the vast number of Easter Island anthropoliths only one single specimen is recorded (Routledge 1919, p. 184) the head of which seems to have melted into the body, while the large ear and the arm have been fused. But even in this unsuccessful specimen the usual conceptions were present, and the hands were placed in the conventional position on the stomach. From this advanced stage a *further* evolution might well have taken place had the megalithic work not been interrupted. Métraux suggests that the idea of ornamenting statues with red *pukao*, or top-knots, might possibly have been an afterthought, and certain is it that the spectacular grandeur of the statues might have increased enormously had the work been permitted to go on. One of the unfinished statues in the quarry measures about fifty-two feet, and another one, the largest of them all, measures sixty-six feet. (Routledge 1919, p. 182.) If the final undercutting and erection of this statue had taken place, it would have reached the height of a seven-storey building all in one piece of stone, for which reason some archaeologists doubt whether it was really intended for removal from its niche in the quarry.[1] (Plate XXXVIII **2.**)

If these almost completed stone giants had been loosened from their bed-rock in the quarry, the chain of megalithic art would have reached, among the long-ears of lonely Easter Island, a final stage that would have surpassed in its cyclopean dimensions anything achieved during the commencing evolutionary stages abroad. The greater number of the really finished Easter Island statues, however, averaged only some twelve to fifteen feet, and so were smaller than the largest stone men of Tiahuanaco.

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[1] Routledge (*Ibid.*) says: "tradition, it is true, points out the ahu on the south coast for which this monster was designed, but it is difficult to believe it was ever intended to move such a mass."

The settlers of Pitcairn, Raivaevae and Tubuai to the west, and of the Marquesas Group to the north-west, seem to have raised a few statues of the average South American size and then quickly dropped the custom without any attempt at further evolution. Churchill (1912) quotes Mager, who held that some Raivaevae statues resembled those of Easter Island in their enormous ears and their unformed lower bodies resting on stone platforms. Moreover, it is said that on Pitcairn there was formerly a considerable *marae*, ornamented at each corner with a nine feet tall stone man mounted upon a platform of smooth stone. (*Ibid.*) Routledge (1919, p. 313) however, referring to an unspecified Pitcairn *marae*, mentions only one statue which is said to have been on it at one time, whereas she visited an artificial embankment on the coastal cliffs of the same island, where also vestiges of images were found: "In general it resembled to some extent one of the semi-pyramid ahu of Easter, but dense vegetation and tree growth rendered it impossible to speak definitely, ... It was remembered that three statues had stood on it, and that one in particular had been thrown down on to the beach beneath. The headless trunk of this image is preserved, it is 31 inches in hight, and the form has a certain resemblance to that of Easter Island, but the workmanship is much cruder."

It is interesting to bear in mind that when the mutineers from *Bounty* settled Pitcairn the island had no population but only *maraes*, bones and ruins from a former occupation. As Duff (1950 b, p. 9) points out, archaeologically Pitcairn is important, since its vestiges show it was only reached by the earlier, not by the later, Polynesian migrations.

The Puamau megalith site

The principal statues in the Marquesas group are raised in a cult site at Puamau Valley, right beside the uninhabitable east point of Hivaoa Island. During my visit there in 1937 the local white resident, Henry Lee, was convinced that the people who had raised these abandoned monuments must either have chosen this extreme eastern valley because they originally made landfall from the east, or else they must have been sun-worshippers, as the principal valley, Atuona, and all the other inhabitable areas were further west on the extensive island. In Puamau the fishermen's canoes were not even sheltered from the open ocean, which rolled straight up the beach in a roaring surf, driven by the perpetual eastern trade. This practical observation by one who had spent a lifetime among the local natives may well recall that the Rano-Raraku quarry is at the eastern corner of Easter Island, which is the easternmost land of Polynesia. Rivers (1915, p. 431) comments on the only form of worship observed by the discoverers to that island: "Roggeween and his companions observed the inhabitants of Easter Island prostrating themselves towards the rising sun, but as these prostrations seem to have had some relation to the stone statues of the island, it would be dangerous to conclude that the sun was the object towards which the prostrations were directed."[1]

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[1] Roggeween (1722, p. 15) wrote himself: "...we noticed only that they kindle fire in front of certain remarkably tall stone figures they set up; and, thereafter squatting on their heels with heads bowed down, they bring the palms of their hands together and alternately raise and lower them." And Behrens (1737, p. 133): "They kindled many fires by their idols, either by way of offerings or for the purpose of prayer. In the early morning we looked out and could see from some distance that they had prostrated themselves towards the rising sun and had kindled some hundreds of fires, which probably betakened a morning oblation to their gods."

If the megalith sculptors of the Puamau valley worshipped the sunrise, then we are confronted with a *religion* corresponding to that of ancient Peru. On the other hand, if they settled the easternmost valley because they had come from a starting point in the east, then we are confronted with a *direction* corresponding to that of ancient Peru.

As on Easter Island, so also in the Marquesas, the present native population are above all wood-carvers, and make no claim that the large stone statues in their valleys were the work of their own carefully remembered ancestors from legendary Hawai'i. As on Easter Island, the Puamau natives possessed traditional names for most of the large images, the general name for which was Tiki, and they also had a vague remembrance that another people dwelt in the valley prior to their own coming. These earlier inhabitants fled to the surrounding hills, though a number of their women intermarried with the newcomers and so were among the ancestors of the present natives.

With a local native and the son of Henry Lee I climbed a crevice that took us through a narrow artificially roofed hole on the summit of a precipitous finger-shaped peak which rose above the palm-forest behind the image site. A few stone terraces, built either for defence or for a religious purpose, were found on the sloping base of the peak, and a platform nicely paved with smooth slabs and still partly surrounded by a megalithic wall was found on the narrow summit, commanding a perfect view of the bay and the now overgrown image-site below. The whole construction was very similar to fortifications in ancient Peru, and a small store of sling-stones were still *in situ*, an interesting detail, since Emory (1942 b, p. 131) has particularly pointed out that the sling is one of the culture elements which Polynesia shared with Peru.

Subsequent Marquesan sculptors have adapted the conventional style of some of the larger monoliths to miniature house images of stone[1] or wood, but apart from this continuation of style we have ample evidence that the early Puamau sculptors were also interrupted in the midst of their megalithic work. On the terraced temple site some of the great statues have been deliberately overthrown and demolished, but one of those found in the undergrowth had never been finished by the sculptors. Unlike those on Easter Island, these Marquesan images seem to have been transported from the quarry before their completion. Another statue was left behind unfinished in one of the quarries located in a different part of the valley, and in the same place several other carved stone blocks had been abandoned by the early workmen. Yet one of the Puamau quarries seems still undiscovered, for, as on Easter Island and at Tiahuanaco, the sculptors were not satisfied with just one sort of workable stone. Some of the Tiahuanaco figures were specially carved from a reddish sandstone, among them the two bearded figures of Tiahuanaco and Mocachi. The Puamau sculptors had easy access to a fine-grained and polishable grey tuff which had been utilized for a few of their best executed figures, and yet they have given themselves the trouble of carving some of the statues from a very unsuitable coarse-grained but reddish tuff, much like that used for the top-knots on Easter Island.

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[1] These statuettes averaged 6 or 8 inches in height, and are still occasionally found in burial caves and even in native possession. Among a few archaeological specimens of stone secured by the present author, one unusual type had a wide projecting lower face like a beard, and a remarkable straight and narrow nose (Plate LI **9**); another had most contours weathered away but was made from a selected red volcanic rock (Plate LI **8**). Porter (1815, Vol. II, p. 114), during his early visit to the Marquesas, was the first to suggest that the large prehistoric stone statues seen by him in Nukuhiva may have served "as the model of perfection for all the sculptures of the island..."

The tallest of the still standing Puamau stone men has a visible portion of a little over eight feet (2.5 m), in addition to the pedestal sunk between the stones of the platform. Its left arm is intentionally broken off, as also the entire upper section of a statue to the left of it. One of the fallen statues measured about eleven feet before its head was broken off. In the same valley a considerable number of small and beautifully executed images have been moved away from their original sites by the present native population. Some of these, about three feet tall, are carved from white stone and include sepcimens with ear-lobes stretching to their shoulders. Statues of this latter type concur in size with the average of those scattered about the Titicaca basin and found sporadically in South America from Colombia, east and south through Venezuela, Ecuador and Peru, as far as the Tiahuanaco area of Bolivia.

Such figures, from two to six feet tall, were found on most of the principal islands in the Marquesas Group, whereas giants of superhuman size, comparable with those of the Puamau valley on Hivaoa are otherwise only found on Nukuhiva. Here, too, the image-site is not in the main valley, but on a terrace on the side of a steeply sloping hill at Taipi (Typee),[1] one of the lesser valleys further east. The statues are described by Freeman (1921, p. 62): "The images, which had been set at regular intervals around an open stone-paved court, were from six to eight feet in height and averaged about three feet in thickness. We estimated each to contain from forty to sixty cubic feet of hard basaltic stone, the weight of which must have been several tons. As raising so great a weight up the sixty or seventy per cent incline from the valley would have been almost impossible, and as no outcroppings of stone of similar nature appeared nearby, we were forced to the conclusion that the material for the images must have been quarried out at some point higher up the mountain and laboriously lowered to the terrace prepared for them. ... some of the roughly squared rocks in the foundation of the shrine are approximately three by three by ten feet in dimension, and must have taken a small army of men to move and set in place."

The author shows that all these statues were thickly coated with moss. Eleven of them were still in their original position, two had fallen and several unoccupied niches seemed to indicate that there should have been more. Again, in spite of the marked historical-mindedness of the Marquesan tribes, who preserved their genealogical records in a system of knotted strings, they were highly neglectful of the monoliths on their own hillside. Freeman says: "Though this discovery lies within 300 yards of the main trail up the Typee Valley, no native on the island, either by actual knowledge or through tradition, has been able to shed light on its origin, purpose or probable age."

The Necker Island statuettes

A more complete picture of the distribution of stone images in Eastern Polynesia, requires the inclusion of the archaeologically significant statuettes on Necker Island in Hawaii. When this barren and treeless island was discovered by La Perouse in 1786, it was entirely deserted and uninhabited, and the Polynesians on the inhabited Hawaiian islands were apparently unaware even of its existence. (Emory 1928, p. 3.) Yet the little island is covered with vestiges of a former occupation, and in his interesting survey of Necker archaeology Emory (*Ibid.*, p. 112) concluded that these remains must be ascribed to an earlier culture distinct from anything known among genuine Hawaiians of historic time. It is possible that when the present Hawaiians arrived, part of an aboriginal people fled for refuge to this lonely island. Emory's survey convinced him that, in view of the available evidence, it was reasonable to adopt the view that the Necker culture represents a "pure sample" of an earlier culture prevailing in Hawaii before the present Polynesian occupants arrived, whose ancestors established a new culture and new lines of chiefs all over Polynesia some thirty-two to twenty-four generations ago.

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[1] Note that this valley has an aboriginal native name which reappears south of Tiahuanaco. (Part X.)

An important aspect of this early Necker culture, with special interest to this discussion, is the local discovery of a number of small stone images, carved so long ago that weathering has more or less defaced them all. (See also Alexander 1909.) Their sizes range from eight to eighteen inches high, and they are sculptured from a hard vesicular basalt. Emory (*Ibid.*, pp. 111, 118) has shown: "For comparison with the Necker images no examples of sculpture have been found in Nihoa. Few genuine Hawaiian stone human figures are known and these are the roughest crudities, lacking in uniformity." Also: "It should be noted that no stone human images are recorded from central Polynesia or Micronesia, and extremely few from Melanesia."[1]

Emory finds instead that, despite the stamp of local convention, the Necker statuettes display a rather noticeable similarity to the images of the Marquesas Group. He writes (*Ibid.*, p. 112): "In this light the comparatively strong similarities which exist indicate that the Necker images were like the Marquesan images before they took on the familiar convention. It is interesting to note that the inscribed stone idol in the Kalasasaya palace, Peru [i.e. Tiahuanaco], as illustrated by Posnansky (1914, frontispiece) has as many points in common with the Necker images as have the Marquesas. Although the mouth, in being tongueless and proportionally narrow (the lips are parallel and in relief), is not so much like the mouth of the Necker figures, as is the Marquesan, the square eyes in relief and the straight nose in the same relief are identical with the Necker eyes and noses."

This apparently casual reference to Tiahuanaco art form in relation to the Necker stone figures will acquire additional interest when we see shortly that, through intermediate forms in southeast Polynesia, even the stone-lined temple platforms associated with the images in these two areas are fundamentally related.

The general analogy between Andean and East Polynesian stone human statues

Since we now have ample evidence that neither the present Maori-Polynesians in the East Pacific nor the historically known Chibcha, Quechua, or Aymara of the Andes are responsible for the abandoned stone images and statues left in their own habitats, we may, so to speak, cut away all these superimposed tribes, languages, and cultures as mere secondary overgrowth, concealing and confusing our view of the possible continuity behind the makers of the earlier stone carvings. Disregarding the ever-present stamp of local style or convention, we shall immediately discover that all these anthropomorphic stone figures have one characteristic in common: they were associated with unroofed religious sites, and wherever information is available they all represent ancestor gods and genealogical heroes.

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[1] Ellis (1829, Vol. IV, p. 429), in describing how the early missionaries destroyed such pagan remains as the large wooden images and carved mortuary posts of Hawaii, added: "Some of their idols were of stone."

Furthermore, although human in shape and details, they are all wilfully distorted in their proportions, with their heads always enlarged quite beyond reason. Thus Emory (*Ibid.*, p. 102) says of the large-headed Necker statuettes: "The head is more than a fourth the height of the body, and in some more than a third." Linton (1925, p. 71), in his work on the archaeology of the Marquesas, says of the local stone figures: "The head was evidently considered the most important part of the figure, and upon it the artist expended his greatest skill. The legs were considered least important; in many figures they are shortened disproportionally or even omitted." Further: "All the heads are disproportionally large, some of them forming a third of the total height of the figure." Métraux (1940, p. 293), quoting Lavachery, says of the Easter Island statues: "The long head is about three sevenths of the total height of the statue."

Comparable proportions can be seen on all the Polynesian monoliths. Turning now to Bennett's (1934, p. 464) survey of those of Tiahuanaco, we read again that: "The height of the head is from 28 to 40 per cent of the total figure height." The same remarkable proportions are found on all Andean anthropomorphic statues, including those of San Augustín.

The large statues of the Tubuai and Marquesas group were carved at full length and extended downwards in one piece to a large pedestal sunk into a foundation, in full accord with the fashion both in Tiahuanaco and San Augustín. Thus they rest with their feet visible above the ground, unlike the larger monuments of Easter Island, where the submerged base of the image is considered wholly unimportant and often leaves a casual observer with the false impression that the Easter Island statues consist of nothing but heads.

This reverence for the head is even more strongly demonstrated by some of the Marquesas stone images. As Linton (1925, p. 81) expresses it: "The great importance attached by the Marquesan sculptor to the heads of figures probably led to the practise of making heads to which no bodies were attached. Most of these heads were used as architectural decorations, but two very large ones in the temple of Oipona, Puamao, Hivaoa, seem to have had a significance similar to that of the true images."[1]

Posnansky (1914, p. 87) has shown how a number of loose stone heads have been found at the site of Tiahuanaco, some of which may have been architectural decorations such as are seen also on the stone walls at the Chavín site (Pomar 1949, opp. p. 49). Stone heads without attachement to any body occur occasionally around Lake Titicaca and on its islands, and also northwards through the Andes (*Ibid.*; Bennett 1934, p. 482), more especially at San Augustín, where a single monolithic head is 8-9 feet high (Barrades 1943, Plates 72, 156; Bennett 1949, p. 79).

We have already seen that the custom of carving colossal stone heads can be traced right back to the unidentified people behind the so-called "Olmec" culture of Southern Mexico.[2]

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[1] The large stone head of Plate LVI 2 was found by the present author in a district at Hivaoa where no other images were seen.

[2] Stirling's opinion (1940) is that the "Olmecs" seem to have a central position in the local American culture

The people who left behind these giant Mexican heads had also carved their ears holding immense circular ear-plugs decorated with a cross, and they had placed them on paved stone foundations, facing east. (Stirling 1940.) We have seen that a Caucasoid race-type with aquiline profile and strong beard occurs locally in strange contrast to the otherwise primitive-looking, flat- and broad-nosed faces depicted in these giant Olmec heads. The most logical inference from this observation would seem to be that the aristocratic and sophisticated type may depict the creative powers behind the artistically and technically involved megalithic scheme, and that the flat-nosed, indolent-looking stone heads perhaps are carved as ancestor figures for the more primitive labouring people among whom the bearded men had settled as an aristocracy. As already mentioned, a corresponding divergence of types is marked among the Tiahuanaco monoliths.

A similar reasoning could answer the problem why the Marquesan and Easter Island statues, both within Polynesian limits, seem to depict a contrast of race types. It has been said (Lehmann 1933) that the diabolical primitive physiognomy of the Marquesan statues, so distinct from their Easter Island counterparts, may be explained by taking the former to represent mortuary images, the large mouth and the enormous circular eyes corresponding to the skull with its open mouth and orbits. This explanation does not seem convincing, since the eyebrows, the huge fleshy lips with wide superimposed nostrils, and the big ears of the Marquesan figures are not seen on a skull. Those who claim that the early Marquesan race and culture contain certain Melanesian aspects, and that the statues depict the Melanesian physiognomy, seem to have better founded arguments. Still we must admit that we need better evidence before concluding that these grotesque and almost diabolic countenances are intended to depict Melanesians. Similar countenances are also depicted at San Augustín in the northern Andes, where nobody has yet claimed a Melanesian intrusion. (See Plates XLII, LVI.) If the aristocracy behind the stone-shaping art had come from South America, local maritime serfs and labourers (see Part VIII) might have manned their craft down-wind from South America more easily than Melanesians could have been fetched from the other extremity of Polynesia. The Melanesian element in Polynesia is admittedly so negligible that the bulk of the early *Menehune* working class could hardly have had Melanesian affiliations.

In view of the evidence accumulated in Part IV, I wish tentatively to suggest that in Easter Island the statues depict the migrating culture-bearers behind the whole series of megalithic sculpture, the same race which is depicted on the bearded monuments and effigy jars of Mexico and Peru; whereas in most other cases, as with the Olmec stone heads, the majority of statues from San Augustín to Tiahuanaco, and the Marquesan giants, the work has been accomplished mainly with the aid of subjugated peoples whose grotesque ancestor images have been carved to establish a religion intended to allure and impress the working classes in question.

Thus the same race may have originated the Marquesan and the Easter Island monoliths, though the former statues are carved in the image of a low-browed, flat-nosed, flat-faced and thick-lipped people, while the latter represent a people with a long, narrow face, straight

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complex: "Present archaeological evidence indicates that their culture, which in many respects reached a high level, is very early and may well be the basic civilization out of which developed such high art centres as those of the Maya, Zapotecs, Toltecs, and Totonacs."

nose with narrow and prominent ridge, deep-set eyes, thin, sharp, protruding lips, and a long extended chin which is drawn out to a wide, sharp ridge. Though with different talents and means of expression, the artists behind the Vera Cruz slate-mirror, the stelae in Southern Mexico, the Early Chimu effigy jars, the bearded statues of Mocachi, Tiahuanaco, Arapa, and Cacha, and the Easter Island monoliths have all striven to reproduce a series of individuals which all leave us with the same racial impression, otherwise alien to these areas, and resembling in many ways our own race.

We have seen earlier how the consistent use of heavy nuggets in the ear and a fillet round the head has followed this race type from Vera Cruz to Titicaca. Bennett (1934, p. 469) says of the red sandstone figures at present standing in front of the Tiahuanaco church: "The headbands are wide and decorated with a scroll groove which gives the whole band the appearance of a twisted turban." Posnansky (1914, p. 87) similarly says of the loose stone heads of Tiahuanaco: "Many of them show a fillet-like headwear resembling a turban, and a strongly projecting under-jaw, stretched out in the length, which it is likely may indicate a bearded chin." Kidder (1943, p. 29) also mentions how some of the north Titicaca stone images have "heavy protruding chins", and stresses that the head-band is everywhere important on the statues in these parts.

Generally carved as a wide, raised band round the upper head, this ornamentation is one of the local conventions most consistently adhered to, whereas on some of the larger Tiahuanaco monoliths this band takes the shape of a superimposed double cylinder, remarkably like the *pukao* or top-knot on the Easter Island statues. On many Marquesan monoliths, and most emphatically on the many smaller stone statues of the Puamau valley, a wide and raised headband is elaborately carved round the upper head of the figures in a fashion identical with that used in the Titicaca area. Even an examination of the weathered stone giants of the Oipona temple terrace reveals very plain marks of a fillet-like head-band around the upper head.

The reason why these megalithic artists seem to have concentrated their efforts on the carving of the head may well be that the face, more readily than the limbs and the body, could express distinction in race-type. Body and limbs on the other hand would only emphasize the similarity of the subjugated natives to their own divine hierarchy, and should not be made the centre of attention. The heads of important persons are often removed for separate preservation among the aboriginal peoples in both Peru and Polynesia, and to judge from Nazca and Chimu paintings and other early Peruvian art, trophy-heads seem to have been the victors aim there as in Polynesia and on the Northwest Coast.

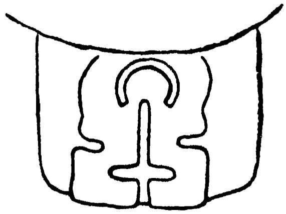
Owing to the colossal heads on these images very little room is left for shoulders; the neck is always omitted, and it often seems that the sole reason for carving a body is to form a background for the arms. The important point about the arms does not seem to be their shape, but their particular posture. Some slight freedom in the position of the hands may be seen on the mainland, but there too the hands are almost invariably placed on the chest or the stomach in a ceremonial way, and this frequently stiffens into a highly conventionalized form met with all the way from Mexico and Central America to San Augustín and Tiahuanaco. This same conventionalized posture is carried into the Pacific, where it is universal on the Easter Island statues and more typical still on the hundreds of statues and statuettes in the Marquesas. The typical features of this pose is that the vertically carved upper arms are withdrawn often in a strained way towards the back of the figure, with the elbows bent at right angles and the lower arms placed horizontally round the body to make the hands meet on each side of the stomach just below the chest. In a few cases one of the hands is raised above the other to rest nearer the chin. (Tiahuanaco, Mocachi, Huancane; Marquesas, Tubuai.) It looks as if this artificial pose had some religious significance.[1]

Below the arms these American-Polynesian statues and statuettes generally terminate in thick, clumsy and stunted legs, about as long as the head or even shorter, if not omitted. On larger statues the monolith often continues below the feet as a peg-shaped submerged pedestal.

Only one more detail requires attention. Describing the bearded monolith of Tiahuanaco, Bennett (1934, p. 442) wrote: "Below the arms is a narrow undecorated waistband." To which he again referred later (*Ibid.*, p. 465): "All the figures have a wide, flat waistband, decorated in low relief or by incision." When Routledge (1919, p. 187) made her interesting survey of the Easter Island statues, she also examined their lower, submerged sections, which, she says, "when excavated, proved, to our surprise, to possess a well-carved design in the form of a girdle shown by three raised bands, this was surmounted by one or sometimes by two rings, and immediately beneath it was another design somewhat in the shape of an M. The whole was new, not only to us, but to the natives, who greatly admired it. Later, when we knew what to look for, traces of the girdle could be seen also on the figures on the ahu where the arm had protected it from the weather."[2]

The prone statues of Puamau and San Augustín

We cannot leave these anthropomorphic monuments without reference to a single and remarkable specimen from the megalithic image-site of the Puamau valley, Marquesas. This remaining monument is quite unique at least in Polynesia and the entire Pacific island world. It rests on the lower platform of the Oipona temple terrace, but is made to lie horizontally instead of standing erect like the others. Worked in one piece, with its supporting cylinder-shaped pedestal extending downwards from the abdomen, it stretches its five-feet length in a prone position, almost as if swimming. During my visit to the valley I examined this beautifully executed monolith with some care, and noticed some surface irregularities where the pedestal emerged from the ground. On the dirt being removed from the base of the pedestal four figures carved in relief round its base were exposed. The one at the front and the one back were greatly stylized human figures each enclosing a distinct cross. The other two, sculptured one on each side, were animals with long body and raised neck, a stubby muzzle, rounded ears, a raised tail and stunted, deformed legs. (Plate LIII **2**, **4**.) Each



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[1] It has been suggested that this pose is perhaps practical for the carving. This is not so. When, as in the Marquesas, the same pose is transferred to the *Tikis* carved in wood, the lower arms must be cut against the fibres of the wood. Images among peoples in other parts of the world certainly do not adhere to this peculiar posture.

[2] Apart from the important girdle, the bodies of the Easter Island statues were undressed and unornamented; the arms were flexed and the long-fingered hands met over the abdominal region near the navel.

of these animals was 19 inches long, but one was almost worn away by erosion. The discovery was new even to the Puamau natives, who were most excited when they saw the exposed figures.

My first impression was that these two animal figures carved in relief on the pedestal depicted some sort of a dog, but a dog quite distinct from what little is known about the extinct Polynesian *kuri*, for it had a strangely erect and bare tail, rounded ears, and a long even body. Only when later confronted with illustrations of the two four-legged, long-bodied, round-eared, and slim-tailed animals carved in relief in a corresponding manner on the base of the bearded Tiahuanaco monolith, did I begin to wonder whether the two animals similarly reproduced on the Puamau statue could have been based on a former symbolism rather than on an unidentifiable type of dog used as actual model. The animals on the Tiahuanaco monolith represent the locally important feline symbol, the puma.

Even more remarkable than these animals carved on its base, is the main figure itself. We find no analogy on any of the other islands, and we would have been led to assume that this was an unorthodox and original creation of the otherwise conservative Marquesan artist, had it not been for the fact that a completely analogous monolith has been discovered at San Augustín, the gateway to Andean cultures. The close affinities between the general type of monolithic statues left in these two areas have already been mentioned. With the added convergence of the two exceptional prone figures the likelihood of an underlying relationship seems quite insistent; the similarity is too peculiar to be the work of independent thought. Both specimens are somewhere near five feet long (that from San Augustín is 176 cm and that from Puamau 150 cm); both are strangely stretched, horizontally on their abdomens, in a strained pose. The very short, bulky arms are bent forwards, one on each side of the face which is so large that the hands do not project in front of it. In both cases the body is extremely broad, stocky, and short, with very stunted legs bent at the knees with the feet turned backwards. The round head is huge, bent back without a neck and looking forwards and slightly upwards. The eyes in both cases are large, the nose very broad and very flat, and the mouth is simply enormous, carved on both as a long and narrow oval spanning the entire lower portion of the face from one side to the other, leaving space neither for cheeks nor chin. The figures have no dress or ornament other than a strange object on top of the heads; it is carved as a flat, wide crest, slightly raised, curving across the crown with almost identical size on both figures. The only difference is that in the Marquesas it is placed sideways over the crown instead of lengthwise as on the San Augustín specimen. (Plate LIII.)

What Preuss (1931, Vol. I, p. 83) says of the San Augustín statue is as true of the Marquesan replica: the stretched-out posture is unnatural even for an animal. He wonders whether the figure can represent a dog rather than a man, but finds the nose, like nearly all the rest of the face, to have a human aspect; and this may be said of at least all the front part of the sculpture. Only the unformed rear end, projecting between the stunted legs of the San Augustín specimen, might suggest an animal rather than a man.[1]

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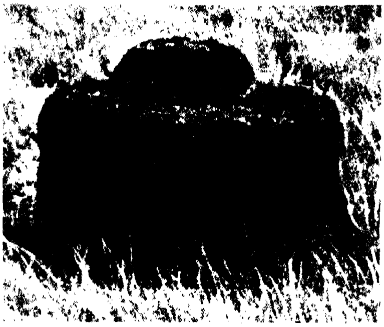
[1] Nowhere else to-day do we find a stronger similarity to this South American statue than on the said eastern extremity of Puamau in the Marquesas Islands. But some vague resemblance might be found in certain more zoomorphic altar stones and images in ancient Mexico. A good example of these is the crouching feline animal from Izapa reproduced after Stirling (1943, Pl. 59 b) in Plate LIII 8.



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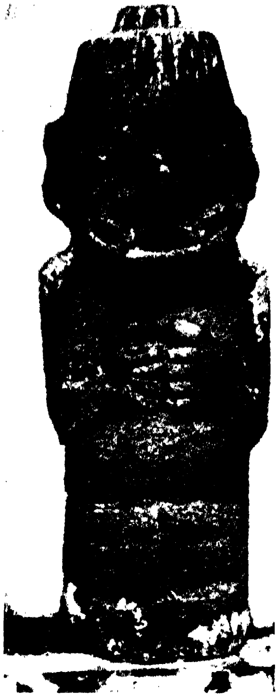

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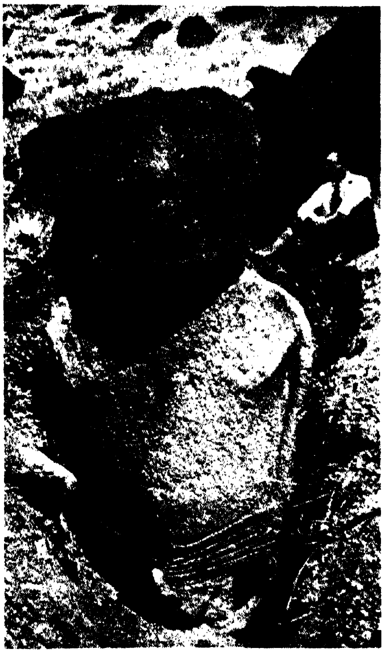

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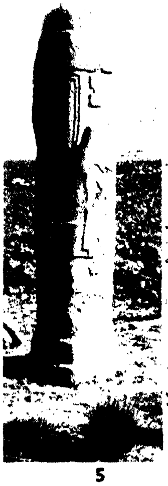

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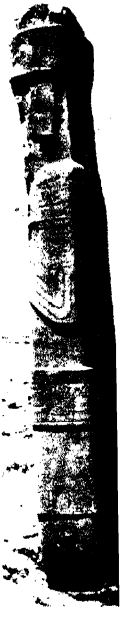

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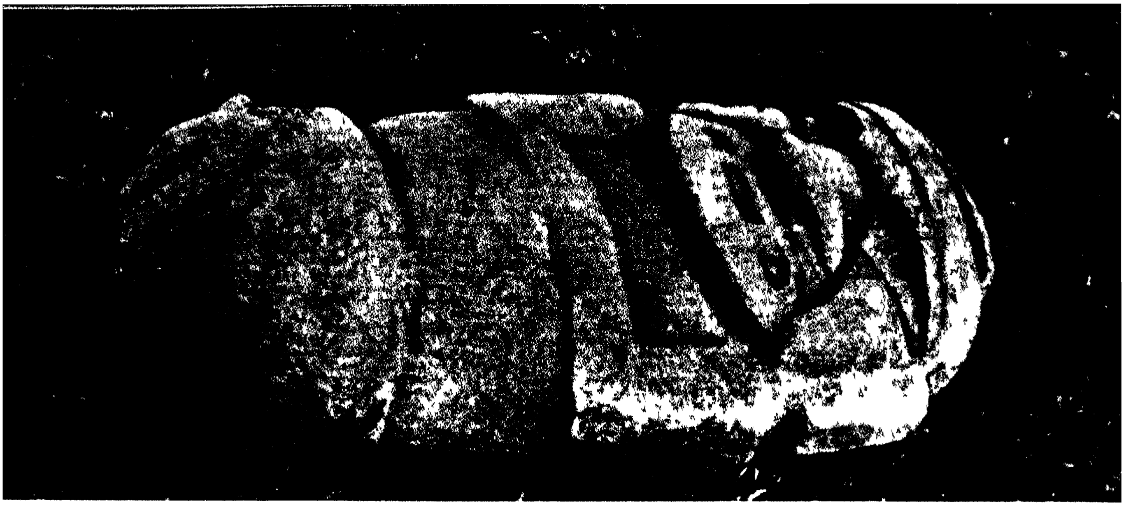
Certain Easter Island statues originally had huge hat-like cylinders of a reddish volcanic tuff placed at the top of their heads. The natives referred to them as top-knots, the local form of masculine coiffure. **1** and **4** top-knots from fallen Easter Island statues. (From *Casey 1932*; *Routledge 1919*.) **3** Excavated Easter Island statue. (From *Routledge 1919*.) Similar ornamentations occur on statues from San Augustin, **2**, (from *Barradas 1943*), and they are even more common in Tiahuanaco, **5, 6**. (Photo: *Musée de l'Homme*.)



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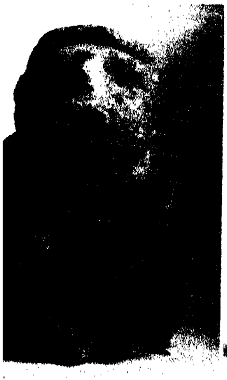
Larger stone statues in South America and Polynesia were carved with a pedestal submerged in the ground beneath the feet of the figure. **1** San Augustin. (From *Barradas 1943*.) **2** The Marquesas Islands. (Photo: *T. Heyerdahl*.) **3** The Tubuai Group. (Photo: *B. P. Bishop Mus.*)



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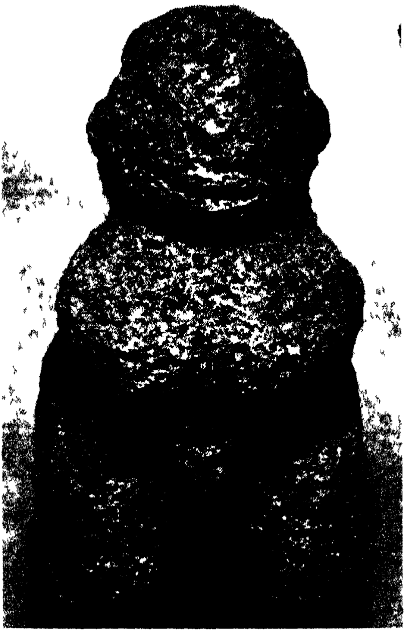

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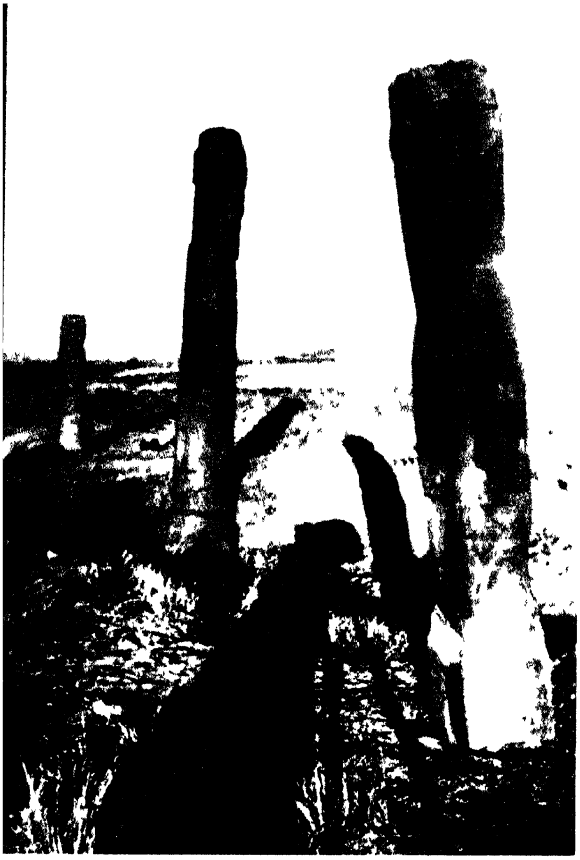
Small stone statuettes in human form are widespread from Mexico to Peru. A similar type occurs on the nearest islands in the Pacific, i. e. Eastern Polynesia. But in Central and West Polynesia, and in Micronesia, no stone statuettes of any sort were carved. **1-3, 5** Mexico, **4** Colombia, **6, 8, 9** Marquesas Islands, **7, 10** Titicaca basin, Peru. (Photos: 1-6 *Musée de l'Homme;* 7, 10 *Peabody Mus., Harvard Univ.*; 8, 9 *T. Heyerdahl.*)



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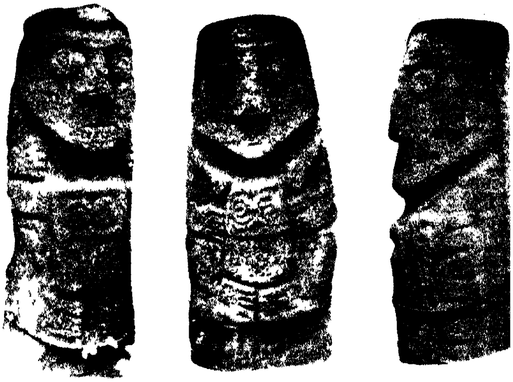

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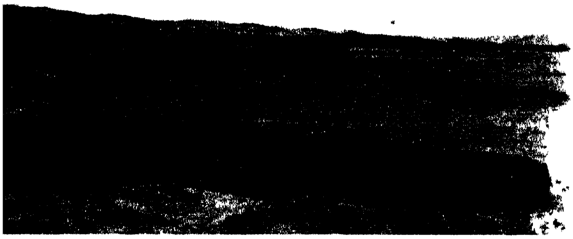

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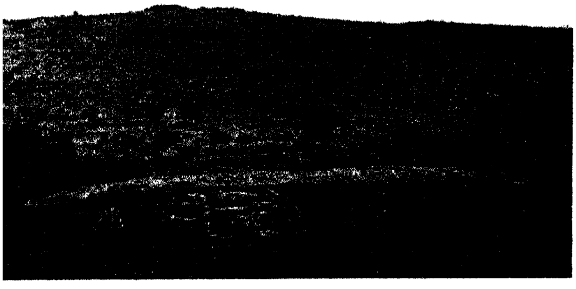

Stone men in the Andes. **1** Tiahuanaco, Bolivia. (Photo: *L. D. Gismondi.*) **2** Aija, Peru. (From *Bennett 1944.*) **3** Conima, Peru. (Photo: *Peabody Mus., Harvard Univ.*) **4** Mocachi, Peru. (From *Casanova 1942.*) **5, 6** Huancane, near Tiahuanaco. (Photo: *M. Portugal.*) **7** San Augustín, Colombia. (Photo: *John Costa, Black Star.*)

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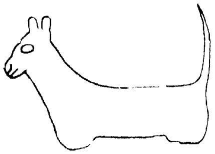

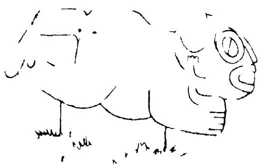

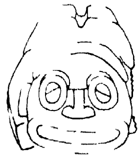

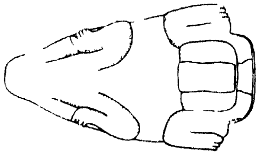

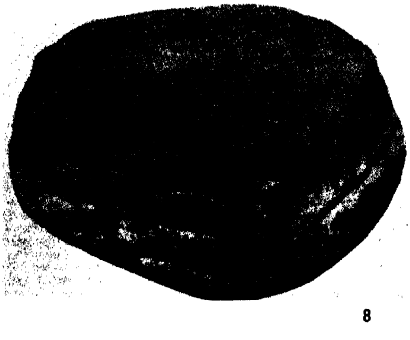

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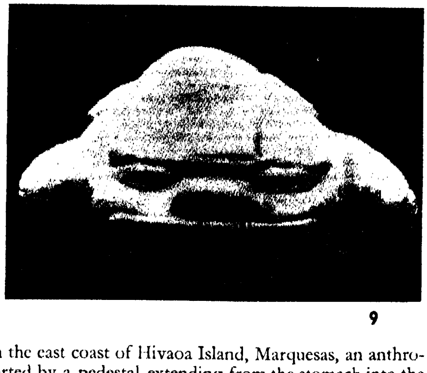

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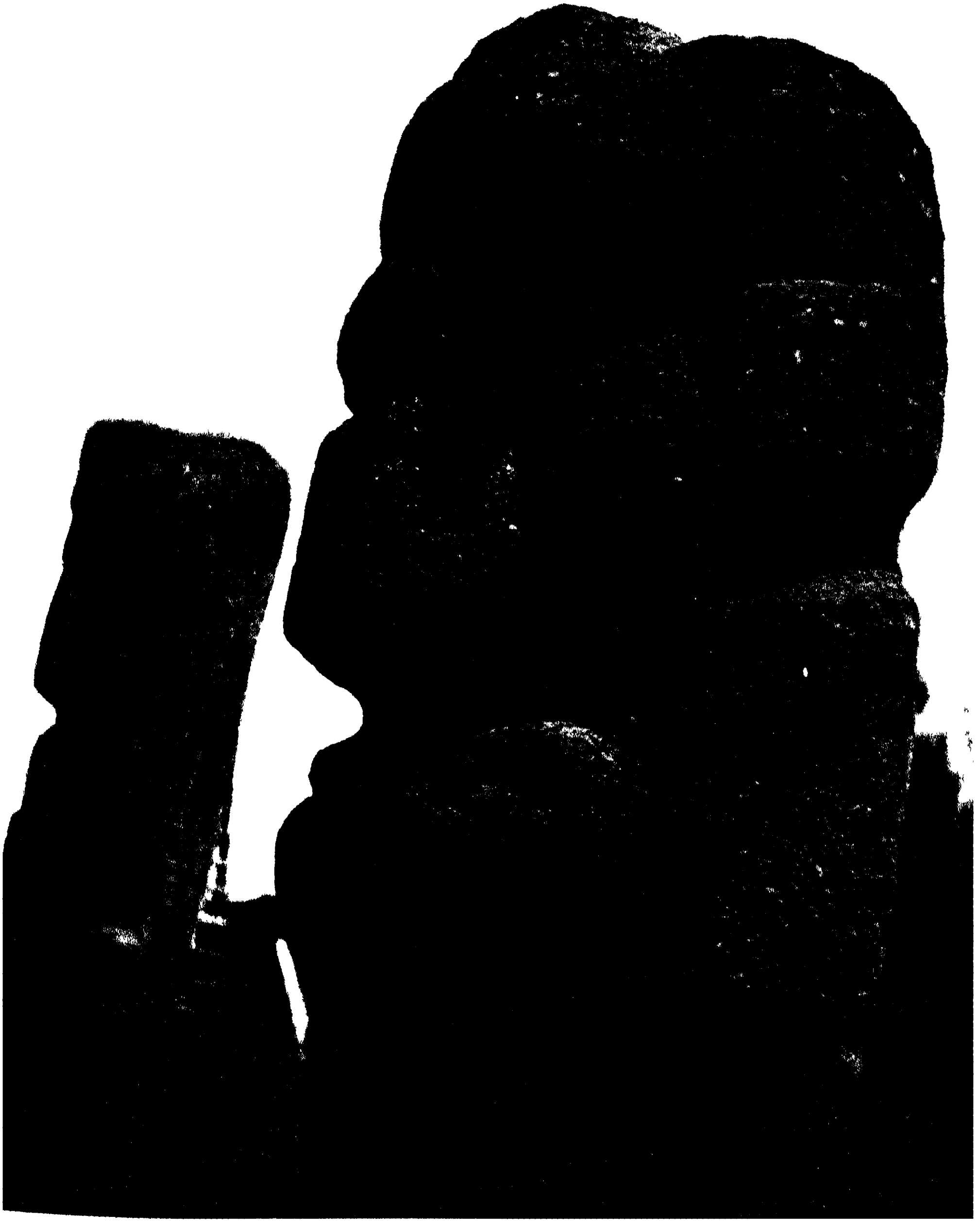
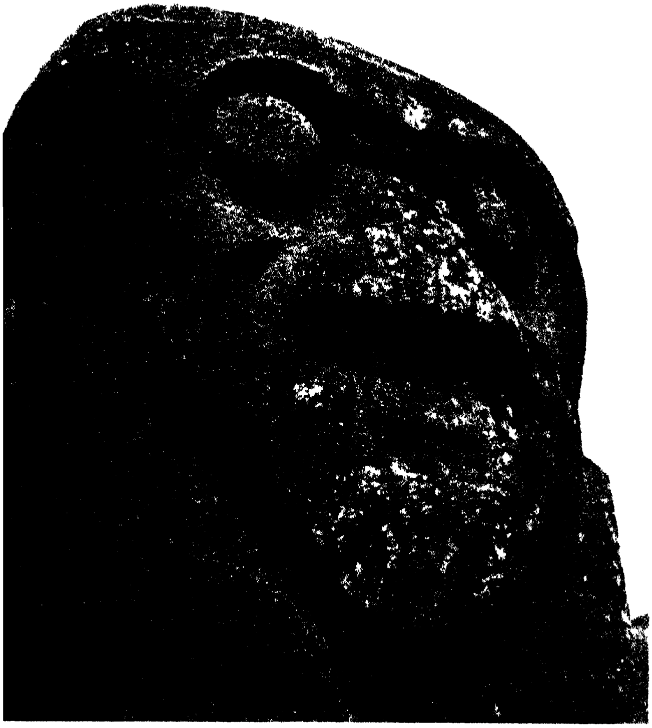
The prostrate monolith. On the prehistoric temple site on the east coast of Hivaoa Island, Marquesas, an anthropomorphic statue is carved so as to remain prone, supported by a pedestal extending from the stomach into the ground. **1, 3, 5, 6** side and front view of same. **2, 4** an animal figure in relief on each side of the pedestal. (*Heyerdahl 1938*; *1941 a.*) **7, 9** Corresponding prostrate monolith from San Augustín, Colombia, seen from above (**7**) and from the front (**9**) (from *Preuss 1931*); and **8** a somewhat analogous altar stone from Izapa, Mexico. (From *Stirling 1943*.)

Stone giant of Raivaevae Island, Tubuai group, Southeast Polynesia. (Photo: *B. P. Bishop Mus.*)



Stone giants of San Augustín, Colombia, South America. (Photo: *John Costa, Black Star.*)



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Grotesque faces with huge circular eyes, flat, wide noses, and large oval mouths. **1** from San Augustin. (Photo: *John Costa, Black Star.*) **2, 3** from Hivaoa Island, Marquesas. (Photo: *T. Heyerdahl.*) **3, 4, 5** broken and overthrown statues, Hivaoa Island. (Photo: *T. Heyerdahl.*)

The easterly oriented distribution of cut stone technique in Polynesia

The anthropomorphic monoliths and statuettes of Eastern Polynesia represent perhaps the most distinguishable religious structures of the East Pacific. Closely associated with this culture element are ecclesiastical constructions some of which consist of carved and dressed stones arranged as enclosures or elevated platforms.

It is not surprising that a stone-shaping neolithic people, capable of working monoliths into human form, were also experts in forming and dressing slabs for ecclesiastic masonry and other religious purposes. The people who spread the stone men into eastern Polynesia must automatically be suspected also of having introduced the generally associated religious buildings. Nevertheless, we shall look away from what we have found with respect to the anthropoliths, and consider the other stone structures as if they were independent culture traits. Thus we shall first see whether the carved stone masonry may have entered Polynesia from the west.

Buck (1930, p. 670) has reviewed the stone structures in the Samoan group, which would be the geographical gateway to Polynesia for migrants entering this part of the ocean from the west. He shows that Linton, who had listed the absence of cut stone in Samoa, formed one exception in some wall posts in an ancient stone house (Fale-o-le-Fee) near Apia. Buck shows that even this was a false alarm, as he calls attention to the fact that "the stone wall posts consist of natural basaltic prisms that the hand of man took no share in shaping. Connected with the negative condition in Samoa is the absence of stone figures of human form, which are a feature of eastern Polynesia."

In stressing the total absence of cut stones in this western sector of Polynesia, Buck also searches in Samoa for structures comparable to the characteristic forms of religious buildings in the image area further east. Under the heading "Stone structures" he says (*Ibid.*): "In Samoa, the marked feature in stonework is the absence of stone religious structures corresponding to the marae of the east central area and the heiau of Hawaii. The lack of remains of such structures may indicate that the marae type of religious structure came east by a more northerly route that missed Samoa, west from America, or was locally developed in the east central area." Leaving us with these three remaining choices, Buck gives precedence to none of them. It may be interesting to examine them one by one.

If the cut stone technique or the *marae* type of religious structure came east by a more northerly route and thus missed Samoa, it must have passed through either the Gilbert or the Ellice Islands. Since these atolls contain no religious structures corresponding to the dressed stone *marae* of east central Polynesia, they may be ruled out, with the entire Micronesian route, as a possible stepping-stone to East Polynesia, by the same argument by which Buck himself ruled out Samoa. We are thus led to admit that the Polynesian stone-cutting technique, as well as the dressed stone *marae*, was either developed locally in East Polynesia, or else, like the stone men, brought from South America.

Turning our attention now from Samoa and the west to the opposite gateway into Polynesia, the island nearest Peru, we find a strikingly different picture. Métraux (1940, p. 290) writes : "Cut stones were used extensively on Easter Island. Dressed slabs or blocks are found on most of the big ahus and appear in structures such as wells and underground houses, and in the stone houses of Orongo. ... The excellence of Easter Island stone work is due partly to the use of hard vesicular basalt. Though cut stones were not so common on Easter Island as in the Marquesas, they show a more elaborate technique. ... The facings of a few Easter Island ahus are among the most perfect masonry work in Polynesia. The slabs or blocks have not only been smoothed to evenness, but they have been dressed or selected so as to fit exactly. The masterpiece of Easter Island stone work is the ahu Vinapu: The seaward wall is made of two rows of marvellously smooth slabs whose edges join with mathematical accuracy. The corner slabs have been rounded. A hole in the face has been patched with a stone carved to fit perfectly. Such a facing resembles the famous walls of the Inca palaces of the Cuzco."

But having made this interesting admission, the author hastens to add briefly: "There is neither geographical nor chronological link between the two cultures." Yet a glance at the map makes one wonder what the author means by denying a geographical link between Easter Island and the Inca Empire, unless he is thinking of a head-wind journey up against the elements *from* Easter Island *to* Peru. One may be equally justified in wondering what he means by denying the chronological agreement between the famous Cuzco wall and that on Easter Island, for, as we have seen, some of the oldest and best executed sections of this great-stone masonry of Cuzco are associated with the Viracocha cycle and considered by competent archaeologists as dating back to the Tiahuanaco period in the Andes.

The skill and technical perfection embodied in just these particular ruined walls of Easter Island and Peru give them both an outstanding position among megalithic masonry in any part of the world, and yet the one is a close repetition of the other. Their striking resemblance had aroused comment by several earlier writers. (See Plate LVII.) Including in his book an illustration of the same Ahu Vinapu on Easter Island for the sake of its Peruvian characteristics, Imbelloni (1926 b, p. 327) says in his caption: "The blocks of lava material are worked with an admirable technique. For its dimensions, for the slightly convex surface, for the reciprocal disposition and the characteristic nature of the commissures, this masonry of the Pacific Ocean may be compared to the best of Peru."

At an earlier date J. M. Brown (1924, p. 257) had also observed, during his visit to Easter Island, that: "The cyclopean work of some of the burial platforms is exactly the same as that of Cuzco and the adjacent regions of the Andes. The colossal blocks are tooled and cut so as to fit each other. In the Ahu Vinapu and in the fragment of the ahu near Hangaroa beach the stones are as colossal as in the old Temple of the Sun in Cuzco, they are as carefully tooled, and the irregularity of their sides that have to come together are so cut that the two faces exactly fit into each other. These blocks are too huge to have been shifted frequently to let the mason find out whether they fitted or not. They must have been cut and tooled to exact measurements or plan. There is no evidence of chipping after they have been laid. Every angle and projection must have been measured with scientific precision before the stones were nearing their finish. The modern mason knows he can fill up irregularities with lime or cement. In these cyclopean walls the only cement is gravitation, and that can be used only once. With nothing but stone tools and these generally clumsy and rough, the result is marvellous."

The same author feels that much labour must have been present to haul, raise, and place the blocks. He adds: "But in cyclopean tooled work there is more; there must be skill in planning what is to issue from a rough block, there must be breadth of architectural thought to mark out the place that each stone when shaped and finished has to take, and there must be also large drafts of that subordinate skill which knows how, with the tools at hand, the shapes in the architects mind and plans can be cut out of the roughly hewn blocks from the quarry, or the fractured rocks that lie about. There are implied in all these carefully tooled and fitted cyclopean walls limitless power and resources, the capacity for organizing great masses of men, keen architectural capacity and large armies of skilled labour."

We have seen above that to explain the erection of the local stone structures we need not look for more man-power than that which Easter Island could easily support, provided the people at work were already well trained to cooperate in this kind of work. There is accordingly no need to follow Brown in his unsupported speculation on land submergences, and we may benefit more from following his three pieces of actual observation, with the logical inference that seems to suggest itself from them:

(1): "In the Andes all conditions [for cyclopean masonry] existed. ... Tiahuanaco on the south of Lake Titicaca had plenty of stone and plenty of muscle to haul it; and the result is a gradual improvement of cyclopean stone-cutting and building till the stage was reached at which one huge block was cut to fit exactly into another."

(2): "The tooling and fitting of cyclopean blocks are exactly the same in Cuzco and in Easter Island."

(3): "On Easter Island there was plenty of stone, but nothing else to make the megalithic art possible..."

The readiest deduction would then seem to be that the great-stone technique which had a logical background in Peru had spread down wind to Easter Island with no necessity of a difficult local development in the latter place.[1]

Examples of elaborate cut stone masonry are found sporadically over the string of Polynesian mountain islands facing America, and as far west as Tonga, which must have evolved the idea locally or else received it from Eastern Polynesia, as it is absent in Samoa and the geographical neighbourhood to the west. This distribution of the stone-shaping art is highly suggestive. Handy (1927, p. 329), who is personally very familiar with this cultural achievement through his field studies in eastern Polynesia, writes: "The art of stone building may, of course, have been independently developed in Polynesia. ... But what probably happened is that during the hundreds of years of very active voyaging some Polynesians visited America and returned to Polynesia, having seen the Mexican or Peruvian stonework, and possibly bringing a few stone craftsmen with them. The fact that both in quantity and skill there is a diminution in the art of building with stone, beginning with the Marquesas, running through the Society Islands and ending at Tonga, is strong evidence in favor of the hypothesis that some eastern Polynesians, probably Marquesans, borrowed the art of stone construction from the west coast of South America; and that within Polynesia the art spread from east to west."

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[1] Cook (1777, Vol. 1, p. 294) who had an early opportunity of examining the Easter Island *abus* while several of them were in a better condition than today, wrote: "They are built, or rather faced, with hewn stones of a very large size; and the workmanship is not inferior to the best plain piece masonry we have in England. They use no sort of cement; yet the joints are exceedingly close, and the stones morticed and tenanted one into another, in a very artful manner. The side walls are not perpendicular, but inclining a little inwards, in the same manner that breast-works, & c. are built in Europe..."

As just quoted from Métraux, cut stones are even more common in the Marquesas group than on Easter Island. A great number of the Marquesan stone-platforms (*paepae*) are constructed as a masonry of large skilfully dressed stones some of which weigh several tons. In various parts of the group, especially in Hanavave and Omoa valleys on Fatuhiva, and Puamau and Hanaiapa valleys on Hivaoa, the present author visited a considerable number of religious structures lined with beautifully tooled and dressed slabs, preferably sculptured in a selected reddish tuff. Many of these bore notches and squares of mathematical exactness, and some, in the Puamau valley, had inserted in the masonry the most beautifully executed specimens of stone statuary to be seen in Polynesia. On others, human figures with arms half raised above the head were carved in high relief on the face of the tooled stone slabs, offering a most striking resemblance to the similar figures on the vertical wall of the sculptured stream bed at San Augustín. (Barradas 1943, Plates 143, 145; Steward 1946, Pl. 174.)[1]

In his survey of Marquesan archaeology, Linton (1925, p. 18) does not believe the cut stone technique to have been developed locally in the Marquesas, because there is no evidence of transition from the uncut to the elaborately cut stones.

Facing America in mid-ocean between the Marquesas and Hawaii lies little Fanning Island. Emory (1934 b, p. 15) has shown how this isolated speck possesses remains of religious dressed stone enclosures showing nicely fitted joints and even L-shaped cornerstones, a technique reminiscent of that used on some of the elaborate *maraes* on lonely Tongareva, west of the Marquesas, as well as in the Tonga Islands.

We have earlier seen that among the Hawaiian remains of the earliest island era was the Menehune watercourse at Kauai with its large megalithic wall, which has been referred to by Bennett (1931, p. 110) as the acme of stonefaced ditches. This dressed stone wall, carrying water round a precipice in a runway 400 feet long, is now nearly covered by a modern road, but was described long ago by Vancouver, who admired its exceedingly good construction, rising about twentyfour feet. Its dressed stones are squared off on all sides but the inside, and are fitted most skilfully together so as to present a smooth, even surface. Bennett (*Ibid.*, p. 105) says: "The size of the blocks shows great variation, some measuring 5 feet in length and over 3 feet in depth and width. There was no attempt to cut them all the same size. The masonry shows true coursing in some places, but it is by no means consistent, and many square joints, with the corners of four stones meeting at one place are found. The jointing found in several places has caused great comment."

The facing of the wall includes square joint, joint projecting from stone above into notch in stone below, double joint, etc. (*Ibid.*, Pl. 3), all of which strikingly resemble the facing of pre-Inca walls in Peru.

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[1] In Polynesia relief carving was used on a large scale only in the Marquesas and Easter Island, with a casual occurrence elsewhere, but always on the islands nearest to America. Métraux (1937 a) points to the striking resemblance which two figures in a Hawaiian relief carving display to some cat-like signs of the Easter Island tablets (see fig. page 505), yet he interprets the limited and casual distribution of relief carving in the eastern margin of Polynesia as "good evidence that this technique has developed independently in different islands and that there are no historical connections between the cultures which practised relief carving." In view of the similarity between the carnivorous animals carved in pairs in relief around the base of the Marquesan and Tiahuanaco stone statues referred to above, it may seem as if such a conclusion should perhaps be reconsidered. Sculptured reliefs, often representing feline figures, are not infrequent in the Titicaca area (Nordenskiöld 1907—08; Posnansky 1914; Rydén 1947; etc.) and occur in San Augustín (Barradas 1943, Plate 149; etc.).

The outstanding authority on East Polynesian stone-facing technique and stone religious structures is Emory (1928; 1933; 1934a; 1934b; 1939; 1943; 1947), and his attempt to analyse the inter-island relationship and common origin of this remarkable archaeological trait is also highly interesting and suggestive. Referring to the cut stone masonry of the Menehune irrigation ditch at Waimea, Kauai, he says (1933, p. 47; Italics by T. H.):

"All these features are to be seen among the dressed blocks now scattered through the village of Kailua on the island of Hawaii, incorporated in doorsteps, corners of stone buildings, or placed about as benches. They come from the facing of some structure, which once stood at the shore of Kailua bay. ... We see now that the Kailua stones had been fitted into a facing identical with that of the ditch traditionally built by the menehunes at Waimea, Kauai. These facings differ in no important respect except for the occurrence of diagonal joints from the facings of notched-squared blocks to be seen on Meetia in the Society Islands, and if the two Hawaiian examples were executed by migrants from Tahiti one or the other or both of them must have been made before the time of Umi, who lived between 12 and 15 generations before 1900. ... That the construction of facings of rectangular blocks of unequal size, necessitating in some instances the cutting of shoulders or jogs in order to bring the top of the finishing course at a level, is an old technique in southeastern Polynesia is clear from its appearance in prehistoric image platforms of Easter Island, where it is even more at home than in the Society Islands, the only other place in Polynesia from which it has been reported besides Hawaii. While it may have evolved either in Tahiti or Easter Island, *its appearance as the dominant note in the cut-stone facings of ancient Peru makes South America a possible source, with Easter Island, where its megalithic aspect brings it more in line with the Inca work, the introductory point.* As it is now generally agreed that the sweet potato in southeastern Polynesia is an introduction from America, and one antedating the final dispersals to Hawaii and New Zealand, it is quite within reason to entertain an American origin for a cultural element so specialized as this stone facing. It is a conspicuous element localized in the part of America nearest to Polynesia, a part where currents strike out and flow in the direction of Easter Island and the Tuamotus. This current in 1929 carried a flock of drums of gasoline from some wreck on the South American coast into the Tuamotus, bringing timely aid to the nearly exhausted supply of our party. May not one of the seagoing rafts of the early Incas have been swept into this current carrying survivors as far as Easter Island 2 000 miles to the west?"[1]

We have seen that Emory later abandoned his own theory on the assumption that the Peruvian balsa raft rapidly became water-logged and was therefore unable to take such a prolonged down-wind journey. However, since his informants were decidedly wrong on this point, Emory's original view with regard to a possible American origin of the cut stone masonry of Polynesia has proved to be sound and may well be revived.

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[1] In his paper of 1943 on "Polynesian stone remains", Emory (p. 11) maintains that the Polynesians masons "*need* not have had any relations with South America to have produced what they did", but that they "*could* have learned some of the details of the dressing and fitting of stones from that region if they had had contact with that part of the world," whereas "the acquaintance which their ancestors might have had with similar work in Asia or Indonesia would have been a scant practical help."

Referring to the isolated stone-facing technique of Tonga, Emory (*Ibid.*, p. 50) says: "To the adjacent west we look in vain for such cut-stone work, but to the east is work from which the Tongan could be derived. All the typical facings of the Society Islands, even those of dressed stone, save the specialized facings of the coastal type of marae, are duplicated in Hawaii, but to such a feeble extent that it must be admitted that the Hawaiian equivalents are most likely derived from the southeast. The Marquesan, Austral, and Tongan cut-stone work is probably of more recent date than the Tahitian, and therefore due to Tahitian influence."

Of Tahiti the same author (1943, p. 10) writes: "For the working of hard basalt the Tahitians can claim the most distinction, although the Easter Islanders may dispute the claim. ... The Tahitians took small river boulders, flattened the top, bottom, and sides by the laborious pecking process, and so fitted them in even courses in the facing of their maraes." Thus in Tahiti marae constructions display more or less elaborate dressed stone facings, but also facings of natural water-worn stones. The even coursing in the facings of these water-worn stones may be the outcome of copying the dressed stone facings, and would seem to make, as Emory (1933, p. 49) points out, "an introduction from Peru more probable."

With the dressed stone facing technique of Hawaii, Marquesas, Tonga, and the Austral or Tubuai group all indicating a spread from Tahiti, or indicating at least a common origin with the equivalent Tahitian art, and with a probable source of the Tahitian technique among voyagers from Easter Island who perhaps again had inherited this highly specialized culture trait from aboriginal Peru, we find—now that the buoyancy of the balsa raft has been established—that we have the same probable origin for Polynesian dressed stone facing as for the local stone human statues.[1]

The marae or raised stone enclosure and related temple forms in eastern Polynesia and pre-Inca Peru

Having so far mainly considered the dressed stone facing technique as such, we may well see whether the same probability of a South American origin also holds good for the types of stone structures to which the masonry technique was applied.

It is a rather striking fact, worthy of the fullest attention, that the Polynesians, who had—principally on their easternmost islands—acquired this admirable skill in stone shaping art with the most intricate forms of jointings and morticing, still had not acquired the idea of a keystone to hold an arch in position and thus permit roofed constructions. Ignorance of the principles of the arch is a basic feature in the early Polynesians' stone constructions, limiting their achievements to uprights, stone statues, walls and unroofed platforms. We may again quote Bennett (in Steward 1949, p. 53) concerning their former neighbours to the east: "Throughout South America in pre-European times some general principles of great importance were totally unknown, thus limiting engineering skills. Outstanding is the lack of knowledge of the wheel. ... Another notable lack was the true arch, with its primary keystone, which was a serious handicap in the development of architecture." This in itself places Polynesian and South American masonry architecture on the same level.

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[1] Emory (1933, p. 177), in his discussion of the *Stone Remains in the Society Islands*, also brings up the interesting fact that petroglyphs are almost universal in Polynesia. He adds: "They are rare in Tonga and Fiji. The practice of making petroglyphs, therefore, seems a trait belonging rather to distal (with reference to Asia) Polynesia, than to proximal Polynesia (Samoa, Niue, Tonga, Wallis, and Futuna)." Emory feels that the more general type of petroglyphs found in Polynesia are so simple that no reliance can be put on them as proof of cultural contact. He says: "Even in the more elaborate figures possibilities of correspondence through coincidence are great. For example, the unique cross and Y markings on the body of the turtle [ref.] are exactly paralleled on the body of a human petroglyph in Brazil [ref.]. Masks, ceremonial costumes, and head-dresses are also represented by Brazilian petroglyphs [ref.], and I have seen them somewhere represented in petroglyphs in the West Indies. Yet these considerations do not leave the petroglyphs without value in pointing out cultural contact; they only warn against exaggerating the significance of identical forms." Other writers have pointed out that Polynesian petroglyphs point to America rather than Asia.

When we now come to consider the principal types of temple and ecclesiastical building in early Polynesia, we find them to fall into two main categories—stone enclosures and raised stone platforms. Both are found in a varying degree of elaboration, and elements from both are very commonly found combined.

We shall first consider the *marae*, which we have already found most likely to be an introduction from America or a local development in east central Polynesia. There is reason to believe that the *marae* as a religious structure belongs to an early era of Polynesia. We have already mentioned that it is found in Pitcairn, and that Pitcairn was only settled by the earlier wave of Polynesians. Emory (1928, p. 112) found the *marae* as a rectangular platform, lined with slabs and with uprights along the back, to be the principal ecclesiastical construction of the early Necker Island culture, which again he considered a pure sample of the culture prevailing in Hawaii before the coming of the present population. If the Menehune, as indicated above, were the manual masons of an early island era, then the Necker *marae* and statuettes would have been roughly contemporary with the Kauai aqueduct, like several other stone constructions of prehistoric Hawaii, most of which are accredited by the Hawaiians themselves to the work of the earlier Menehune.[1]

At the same time Emory points out that the Necker island *maraes* are most closely related to those common in the extreme eastern margin of Polynesia, facing Peru. He writes (1943, p. 13): "The Necker maraes, with their continuous row of uprights along the back of the platform, are most like the maraes of the more isolated eastern end of the vast Tuamotuan Archipelago. Although Necker was unknown to the historic Hawaiians, its ancient visitors certainly came from the main Hawaiian group, as the squid-lure sinkers and adzes found on the island are Hawaiian. Crude replicas of the Necker maraes were discovered by the writer in 1937 at the quarries of the adze-makers on the 12 500 foot contour of Mauna Kea, the highest mountain on the island of Hawaii. At Puu o Umi on the slopes of neighboring Mauna Loa, a low, narrow platform, bearing uprights similar to the Necker marae, has been photographed. [Ref.] But the Necker type of marae has been all but obliterated in Hawaii."

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[1] See Part IV. Thrum (1907, p. 116) also says: "The Menehunes are credited with the construction of numerous *heiaus* (ancient temples) in various parts of the islands. The *heiau* of Mookini, near Honoipu, Kohala, is pointed out as an instance of their marvellous work. ... Another temple of their erection was at Pepeekea, Hilo, ... There stands on the pali of Waikolu, near Kalaupapa, Molokai, a heiau that Hawaiians believe to have been constructed by no one else than the Menehunes. ..."

This early Hawaiian type of *marae* had its counterpart also in the interior of Tahiti. Emory writes (1928, p. 117): "I have seen at one spot in the interior of Punaruu Valley, Tahiti, eleven maraes, and these happened to be in many essential features identical with the Necker Island marae." Two years later Handy (1930 b, p. 94) wrote: "It is interesting that it is in the interior of Tahiti, where the Manahune folk lived, that the expeditions of the Bishop Museum have discovered the most solidly built stonework."

This concurrence of data seems to indicate that the *marae* already had a wide distribution in eastern Polynesia in the early local era. In isolated Tongareva, where some of the most important *maraes* have been found, Smith (1890, p. 91) shows that according to tradition the first *marae* was built by the earliest immigrant settler to reach the island. He says: "The *maraes*, or sacred enclosures, some of which were as much as a hundred yards square, and where all the religious ceremonies were conducted, were enclosed by upright slabs of stone, standing as much as 6 feet out of the ground. Inside were other stones standing on end said to be tombs. There were several of these *maraes* in different parts of the group, some deserted and evidently not in use for ages."

There is a considerable inter-island variation in the Polynesian *marae*, from the low coral platform with small uprights along the end, so widespread in the Tuamotus (Emory 1934 a), to the more elaborate stone constructions of the Tubuai group, Raiatea, and Tongareva, with a whole fence of uprights of irregular size (up to 12 feet high in Raivaevae and 13 feet in Raiatea) marking out three or even all four sides of the rectangular platform. Aitken (1930, p. 118) describes a Tubuai marae as "a rectangular space bounded on three sides by a fence of stones set upright in rows like pickets." The uprights were all of irregular size, up to ten feet high above the ground. He quotes Seale, who measured one at 10 × 6 × 1 feet, and another at 9 × 9 × 3 feet. Some of these *maraes* were paved inside to a greater or less degree. "The amount of labor involved in the transportation of the stones to their final resting places in the maraes must have been enormous. Few of the large stones weigh less than ½ ton and the largest one measured weighs about 4 tons. . . . Furthermore, many of the maraes are at a considerable distance from places where such stones might have been obtained and some are at elevations above any possible source of supply."

Buck (1932 b, p. 152) says of the Mangareva type of *marae* that it generally has a rectangular ground plan, all four boundaries of which are defined by limestone uprights. The space between the uprights is filled with a single row of flat coral pieces set on edge. Part of the enclosure was paved, and the carved uprights had peculiar flanges and notches on the upper corners. To show its relationship to the other Polynesian *maraes*, the same author writes (*Ibid.*, p. 179):

"Emory draws attention to the resemblance between the small Tahitian inland marae and those of Necker Island. The large raised platform of the Tapu-tapu-atea marae in Raiatea shows the same technique of construction as those of Tongareva. Huge limestone slabs rising over 8 feet above the ground have been set on edge to form a rectangular enclosure which has been filled in to a height of 8 feet with coral boulders and rocks. . . . In spite of its size and fame, the structural technique and pattern is that of the simple, low platforms of Tongareva.

"It is apparent that an ancient marae structural pattern consisted of an open court with a raised platform at the end, formed of limestone slabs set on end, and filled in with loose material. At the back, tall uprights that may have had some religious significance, or may have been purely ornamental, were set up. On Tongareva progress has proceeded in the direction of defining the boundaries of the court with curbstones and extending the stone uprights to all four boundaries."

The basic relationship between all these forms of east and central Polynesian *maraes* seems quite apparent. The question remains, however, whether the primitive open court with a platform and a single line of uprights only at one end really is the prototype from which the elaborate Tongareva platform, ornamented on all four sides, with tall stone uprights, has subsequently evolved; or whether the latter is the imported ancestral form which, on many small isles and atolls, has been modified to meet the requirements of communities with limited stone resources or more modest demands.

If we return to the image area about Lake Titicaca, we shall find that the essentials of the Polynesian *marae* are found in the Kalasasaya construction at Tiahuanaco. (Stübel and Uhle 1892; Posnansky 1914, pp. 107—114.) Kalasasaya is the main temple of this early abandoned cult-site, and it consists of large uprights defining a rectangular enclosure, 444 feet long and 368 feet wide. As on Mangareva, the carved uprights of this giant Tiahuanaco *marae* also showed curious flanges and notches on the upper corners. Here too the larger monolithic uprights were set in straight lines, and although carved they had no uniform size, and the space between them had originally been partly filled in with a line of smaller loose stones. Furthermore, it is noteworthy that the megalithic upright enclosure of Kalasasaya also had its base artificially raised as a large rectangular earth platform. Bennett (1934, p. 372) shows that this can still be seen, although a considerable amount of soil has been washed away since the pre-Inca times, and agricultural work inside the temple has in historic time assisted in wearing down the artificial terre-plein. Rejecting the unfounded view that the uprights are the remains of a retaining wall once entirely filled up with earth, he tends to support Posnansky's calculation that the raised earth platform formerly reached a level of roughly seven or eight feet (2.30 m) above the uneven plain, to judge from the height of the monolithic stairway that leads up to the rectangular stone enclosure from the east.

Referring to vestiges in early Peru of ecclesiastical architecture similar to that of Tiahuanaco, Bennett (*Ibid.*, p. 483) quotes Tello regarding sacred corrals in the Huaraz region of northern Peru, which "are formed of great stones, planted vertically and arranged in rows in the same style as the enclosure of Kalasasaya in Tiahuanaco." (Tello 1928, p. 279.)

Rydén (1947, p. 153) shows how sacred enclosures, built on Kalasasaya principles, have been found in various pre-Inca sites near the south end of Lake Titicaca, and that temples of this description include the ruin on the island of Simillake in the Rio Desaguadero, referred to by Posnansky, and the ruin recorded by Casanova (1942) on the image site of the bearded Mocachi statues on the Copacabana peninsula. Rydén shows further that stone statues, one of which is strikingly similar to the main statue at Mocachi, are left in the pre-Inca site of Huancané (Wancani), in the plains to the south of Tiahuanaco,[1] and that here also they are associated with stone enclosures which "bear so close resemblance to those of Kalasasaya that ... they must be dated to the Tiahuanaco period." He says (*Ibid.*, p. 86) of the three rectangular stone enclosures of Huancané that: "These courtyards are bounded by more or less complete rows of upright stones or slabs, all of which appear to have been shaped." In another place (p. 153) he says that like those of Kalasasaya and Mocachi "they are demarcated by upright stones between which there possibly was a stone-filling; detached, square-cut stone blocks are here and there to be seen, etc. The main difference would be that at Wancani the stones are of a considerably smaller size than those of Kalasasaya. Whether every one of the stones at Wancani has been trimmed into shape is uncertain. Hence the Wancani ruins, when compared with those of Kalasasaya, impress one as being poorer and more degenerate: one notes the absence of the ample proportions that characterize Kalasasaya."

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[1] The archaeological site of Huancané was first described by Portugal (1937), and the present author is indebted to him for the photographs of the Huancané stone statues reproduced in Plate LII **5**, **6**. Portugal stresses the need for a serious attempt to compare the stone statues of eastern Polynesia with those of the Andean area, from San Augustín and southward to Huancané and the Lake Titicaca area. (Letter to the author dated July 10, 1951.)

Rydén's conclusion is that the religious stone enclosures of Huancané are later decadent imitations of the large Kalasasaya structure of the Early or Classic Tiahuanaco period. This is interesting, as it would illustrate just how much can be expected of those who similarly imitated the colossal Kalasasaya structure on the small Polynesian islands. Unlike the original Kalasasaya of Tiahuanaco, the courts of Huancané are level with the ground or even sunk to a lower level than the ground surface (*Ibid.*, p. 86), wherefore the commonly raised platform foundations of the Polynesian *maraes* have preserved even more of the original concepts of the large Tiahuanaco enclosure than have some of the neighbouring decadent stone enclosures of the Andes.[1]

The stepped platform or truncated pyramid of South America and Polynesia

The great Kalasasaya, or *marae*-shaped stone-enclosure at the Tiahuanaco cult-site, only represents one of the two distinct temple forms raised in that deserted centre, the other being based on entirely different principles. Next to the south wall of Kalasasaya lies the enormous semi-artificial pyramid of Akapana or Hakapana. (Posnansky 1914.) This is a natural hillock artificially reshaped and stone-faced as an enormous stepped pyramid 690 feet square, and 50 feet high. (Steward 1946.) There is reason to believe that it was once even higher. Posnansky measured the top terrace at 32 400 m^2 or roughly 300 000 square feet. Beautifully squared and dressed stones, which once had been used to convert the hill into a stepped stone-faced pyramid, are now scattered about the sides and top terrace, half buried in earth. There is also evidence that the work of convertion was never quite completed. Yet its mutilated condition to-day is partly due to the large quantity of the beautifully dressed pre-Inca stones which have been removed from the Tiahuanaco constructions by the Aymara Indians and modern settlers, for building their own houses and a church nearby, even for the local railway.

As in the construction of the *marae*-shaped Kalasasaya, so also with Akapana, two distinct types of stone were used: a reddish coloured sandstone and a grey lava. As Bennett

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[1] The base of the smaller rectangular enclosure immediately to the east of Kalasasaya in Tiahuanaco also seems to be submerged rather than elevated. Bennett (1934) believes it to be Decadent. This, as stated, has no reflection on the two stone-statues excavated independently within the court, since one of them is dateable as of the Classic period.

(1934, p. 477) shows, it is generally agreed that there were (at least) two phases of Tiahuanaco culture. Most writers follow Posnansky's designation of two periods, based on the stone material and the building technique used. Bennett, however, shows the danger in judging a difference in time periods from a difference in building material. He says of Tiahuanaco: "Sandstone and lava rock are the principal materials used. Some buildings are constructed entirely of sandstone, others entirely of lava, and still others with both stones. ... In the all-sandstone buildings the megalithic upright technique is employed and in the all-lava buildings the notched and jointed blocks are used. In all probability, the sandstone megalithic style precedes the lava joint-block style, although absolute proof is lacking. Furthermore, there is no evidence of any great chronological or cultural discrepancy between the two styles. On the contrary, the fact that Calasasaya, Acapana, and Puma Punci were started with one material and finished, or continued, with another, without any radical changes in building plan, indicates a rather close connection between the two styles."

Bennett also quotes Means (1931, p. 109), who shows that also the pyramid at Vilcashuaman was probably of Tiahuanaco type and period. He furthermore quotes Tello (1928, p. 272) as to the existence of terraced, truncated pyramids in the Huaraz region of northern Peru, where there are also rectangular and megalithic stone-enclosures in the same style as Kalasasaya at Tiahuanaco. He emphasises (1934, p. 484) that, if building technique were analyzed into such elements as megalithic upright enclosures, stepped pyramids, carved stones, jointed blocks, association of statues with buildings, etc., a great many parallels might be drawn between the Chavín-Huaraz section of northern Peru and Tiahuanaco. Furthermore, he says, some of the adobe structures on the coast may eventually be associated with the Tiahuanaco style. As he points out, stone is more readily available in the highlands; therefore architecture of the Tiahuanaco style is best known up there, whereas lowland people, like the Chimu, resorted to buildings of adobe.

In his study of the "Archaeology of the North Coast of Peru", Bennett (1939, p. 22) shows that besides the two larger adobe pyramids near Moche, several smaller pyramids remain on the coast of north Peru. Kroeber (1930 b, p. 21) points out that both real stone and adobe pyramids were built by the early high-culture people of Mexico and Peru, and he says (1930 a, p. 109) of the Early Chimu culture that it raised terraced, truncated pyramids higher than any erected elsewhere in Peru and used, not stone as in the Andes, but large, flat, sun-dried adobe bricks. He shows that: "Important pyramids occur throughout the area."

Even more magnificent than the Akapana pyramid of Tiahuanaco is the almost equally defaced Pyramid of the Sun near the ancient settlement of Moche on the coastal plains of North Peru. This edifice, built of adobe, consists of a basic platform measuring about 748 by 446 feet with a height of 59 feet[1] and bordered by five terraces. This platform seems to consist of a larger southern and a smaller northern rectangle, and on top of the latter was again set a pyramid about 338 feet square and 75 feet high.[2] Seven terraces or steps form the slope of this superimposed pyramid. Some five hundred yards east of this ecclesiastical structure and on the other side of the ancient settlement lies the so-called Pyramid of the

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[1] 228 by 136 m, and 18 m high. (Kroeber 1925.)

[2] 103 m square, 23 m high. (*Ibid.*)

Moon. This consists of six terraces of adobe brick on the three sides clear of the hill, forming a main platform 262 by 197 feet and 69 feet above the plain.[1]

Identifiable Tiahuanaco remains have been found deposited in an artificial cemetery constructed on the platform of the Early Chimu Pyramid of the Sun at Moche. (Kroeber 1925, pp. 199, 208.) Although this in itself does not prove a common origin of the Tiahuanaco and Early Chimu pyramids, it does at least prove the mobility of, and periodical contacts between, local high-cultures. We have earlier seen that bearded Caucasoid effigy jars have been excavated at the very foot of the Pyramid of the Moon, left there by the same early people who erected these two pyramids.

While the stone-faced pyramid of Tiahuanaco and the adobe pyramids of the Early Chimu area represent colossal constructions equalled in no other area of South America, although reappearing, like the monoliths, in Mexico and Yucatan, yet the same conception on a lesser scale seem to have been important in pre-European Peru. Benzoni (1565), whose primitive drawings give much interesting information about life in aboriginal Peru before the all-embracing influence of Christianity, has also illustrated how these aborigines "communicated with the devil" by erecting certain places for religious worship. He shows Peruvian sun-worshippers on what he terms (*Ibid.*, p. 247) "the top of a flight of stone steps made on purpose". The drawing shows natives on the top of a small, stepped and truncated pyramid of the type we are now discussing. (See Plate LIX **5**.)

Since the stepped and truncated pyramid represents an important form of ecclesiastical building in early Peru, and since the largest adobe pyramids of Moche and the large stone-faced earthen pyramid of Tiahuanaco date back to Early Chimu and Tiahuanaco periods, it would seem difficult for pre-Inca voyagers into the Pacific to bring with them only the conceptions of the *marae* form of religious structure, without also reverting, at least on some islands, to the building of some sort of terraced pyramids on a scale compatible with local conditions. It need therefore cause no surprise to observe that the early voyagers like Banks (1896, p. 102), Cook (1768—71, p. 83) and Wilson (1799, p. 207), on landing in early Tahiti, were struck by the discovery of one large and many smaller stepped and truncated pyramids, which we shall find to have been constructed on the basic principles of the pyramids in Mexico and Peru.

The largest of the Tahitian pyramids rested on a low platform nearly three hundred feet from east to west and 267 feet from north to south. The *ahu*, or stepped pyramid, was at the west end of this platform, and measured 367 by 87 feet according to Cook. With an average of more than four feet per step, the total height must have been roughly 45 to 50 feet above the ground. (Banks says 44 feet, Wilson 51 feet.) The bottom step, according to Wilson, was the deepest, being six feet. Today this pyramid, known as Marae Mahaiatea, has almost disappeared and the fragments that remain are overgrown by forest; only a section of the original facing of beautifully dressed stones is preserved. (Emory 1933, p. 72, pl. 5 a.)

In his journal, later published in Hooker's edition, Banks (1896, p. 102) gave the following interesting account: "We afterwards took a walk towards a point on which we had from afar observed trees of *etoa* (*Casuarina equisetifolia*), from whence we judged that there would be some *marai* in the neighbourhood; nor were we disappointed, for we had no

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[1] 80 by 60 m and 21 m high. (*Ibid.*)

sooner arrived there than we were struck with the sight of a most enormous pile, certainly the masterpiece of Indian architecture in this island, and so all the inhabitants allowed. Its size and workmanship almost exceed belief. Its form was similar to that of *marais* in general, resembling the roof of a house, not smooth at the sides, but formed into eleven steps, each of these four feet in height, making in all 44 feet; its length was 267 feet, its breadth 71 feet. Every one of these steps was formed of white coral stones, most of them neatly squared and polished; the rest were round pebbles, but these, from their uniformity of size and roundness, seemed to have been worked. [They were.] Some of the coral stones were very large, one I measured was 3 ½ by 2 ½ feet. The foundation was of rock stone, likewise squared; the corner stone measured 4 feet 7 inches by 2 feet 4 inches. The building made part of one side of a spacious area walled in with stone; the size of this, which seemed to be intended for a square, was 118 by 110 paces, and it was entirely paved with flat paving-stones. It is almost beyond belief that Indians could raise so large a structure without the assistance of iron tools to shape their stones or mortar to join them; which last appears almost essential, as most of them are round: but it is done, and almost as firmly as an European workman would have done it, though in some things they seem to have failed. The steps for instance, which range along its greatest length, are not straight, they bend downward in the middle, forming a small segment of a circle. Possibly the ground may have sunk a little under the immense weight of such a great pile; such a sinking, if it took place regularly, would have this effect. The labour of the work is prodigious, the quarried stones are but few, but they must have been brought by hand from some distance; at least we saw no signs of a quarry near it, though I looked carefully about me. The coral must have been fished up from under the water, where indeed it is most plentiful, but usually covered with at least three or four feet of water, and generally with much more. The labour of forming the blocks when obtained must also have been at least as great as that employed in getting them. The natives have not shown us any way by which they could square a stone except by means of another, which must be a most tedious process, and liable to many accidents through tools breaking. The stones are also polished as well and as truly as stones of the kind could be by the best workman in Europe; . . ."[1]

Forster (1778, p. 543) wrote on his early visit to Tahiti: "The inhabitants of Taheitee shew their reverence to their divinities in various manners, first by the appropriation of certain places for religious worship, which they call MARÀI. These places are commonly on points projecting into the sea, or near it, and consist of a very large pile of stones, generally in the shape of an Egyptian pyramid, with large steps; sometimes this pyramid makes one of the sides of an area, walled in with square stones and paved with flat stones."

Emory (1933, pp. 5, 28) shows in his survey of *Stone Remains in the Society Islands* that, in the Windward Islands (Tahiti, Moorea, Meetia), the shaping as well as the fitting of stone attained a degree of excellence matched in Polynesia only by some of the finest examples of workmanship in Raivaevae of the Tubuai group, in Tonga, in the Marquesas, and in Easter Island. A characteristic structure in the coastal areas is the stepped, truncated pyramid, or stepped platform, raised at one end of a stone enclosure. Thirty-one such ruins were examined in Tahiti, and fifteen in Moorea.

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[1] If it is correct, as has recently been argued, that this particular marae was built shortly before Banks' visit, then one should at least be inclined to wonder if the stones were also shaped in this recent period, or were part of some former ruin that was reconstructed. None would propose that the stepped pyramid, as a religious structure for Tahitian gods, was introduced in European times. Even on a tiny isolated volcanic island speck like Meetia, 60 miles east of Tahiti, the Spaniards in 1772 found a corresponding marae with a stone platform "raised step above step". (Emory 1933, p. 111.)

Second in size to the largest pyramid of Tahiti (Mahaiatea), was one in Moorea (Nuurua), which was 198 feet long, 40 feet wide and in its ruined condition 20 feet high, with probably six or seven superimposed platforms or steps. Most pyramids consisted of four outer steps (three on the pavement side), and measured on the average 60 by 15 feet with a height of 10 to 12 feet.

Also Linton (1923, p. 457) had pointed out that the sacred structures of the Society Islands were "stone enclosures with pyramid at one end." Some of the stepped North Peruvian pyramids can still be seen to have been located at one end of a great stone enclosure. (See Steward 1946, Pl. 52.) In their plan of Tiahuanaco Stübel and Uhle (1892) show the ruins of tremendous stone walls that once enclosed the great Akapana pyramid. As shown by Emory (1933, p. 73), in Wilson's early drawing of the Tahitian pyramid (Plate LIX **3**) the wooden fence has been put in by the engraver, and the stone wall that actually enclosed the court is omitted.

We have already seen that Cook, a decade after his first visit to Tahiti, discovered Hawaii and was led inland by the high priest, who took him for a returning ancestorgod, and thus escorted him up to the early temple of this god. This construction also was a truncated stone pyramid or elevated platform about forty yards long, twenty broad, and fourteen yards in height. The top platform was flat and well paved, and formed the foundation for a small wooden temple. (Cook 1784, Vol. III, p. 5.)

The Hawaiian group contains the ruins of a number of elevated, and often stepped, stone platforms and semi-pyramids resting against hillsides and mountain ridges in the form and fashion often seen in North Peru. Most of them date back to the early era in Hawaii and are associated with Menehune beliefs and traditions. (McAllister 1933; etc.) In his *Archaeology of Oahu* McAllister (*Ibid.*, p. 10) says that among the remaining temples (*heiaus*) in this Hawaiian island "the terraced heiaus or those in which terracing predominates are the most common and impressive." In the Heiau Ukanipo in Oahu the appearance of the construction is described by the same author (*Ibid.*, p. 124) as elaborate and impressive, with four superimposed steps standing out prominently on the three sides clear of the hill, in the same manner as above described from the Pyramid of the Moon at Moche. Many other Hawaiian temples of war, as described and sketched by McAllister, would hardly have caused surprise if encountered in the hills of North Peru.[1]

Allen (1884, p. 251) describes one of the ancient religious structures of Hawaii as "a vast enclosure, of which the stone walls are 20 feet thick, at the base, and 15 feet high; an oblong square, 1 040 feet one way, and a fraction under 700 feet the other. Within this enclosure in early times had been three temples [pyramidal platforms], each 210 feet long by 100 feet wide, and 13 feet high. ... The blocks are of all manner of shapes and sizes;

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[1] Although several of the earlier 'Menehune' *heiaus* were left for destruction, others were apparently maintained by the newcomers to Hawaii, and various types of *heiaus* continued to be built. According to McAllister (*Ibid.*, p. 11), models were made of sand before the local *heiaus* were built. The Peruvians made similar models in clay, and occasionally in stone. (Rowe 1946, p. 224.)

but are fixed together with the neatest exactness. The gradual narrowing of the wall from the base upwards is accurately preserved." To this he adds in a footnote: "This curious style of building is frequently met with in Peru..."

Facing South America in the open water-span between Hawaii and the Marquesas lies lonely Malden Island. Byron (1826, pp. 204, 205) wrote about its discovery in 1825: "We had left the Sandwich Islands with the hopes of visiting Otaheite, or more properly Tahiti; but after ten days' vain attempts to get to windward, we altered our course and gave up our design. We were in some measure consoled for this disappointment, however, when, on the morning of the 29th of July, we unexpectedly saw broken water and low land at a distance, ... We steered for it immediately; and about noon hove-to abreast of it. Mr. Malden and some others immediately went in a boat to examine it. It appeared to be a low coral formation, about twelve or fourteen miles in extent..." Mentioning the local birds, Byron continues: "These, with a small field-rat, a coppercoloured lizard, and a dragon-fly, were the only inhabitants we found on the Island. Yet there are traces of human occupation, if not of habitation. Large square areas raised to the height of three feet above the ordinary surface are here and there to be seen, supported by blocks of wrought coral, and each having in the centre what we may call an altar or table-tomb. Captain Cook has mentioned similar edifices, if they may be called so, in some other uninhabited islands; and they are not very dissimilar in form to places of worship found among the aborigines of South America. We named this island Malden's Island, in honour of the surveying officer... There is fresh water in it."

The South American places of worship recalled in these prehistoric Polynesian ruins were the stepped pyramidal platforms, as may be seen from Dampier's illustration to Byron's text. (See Plate LIX **7**.)

J. M. Brown (1924, p. 3) drew attention to these religious structures on Malden and compared them with the stepped pyramids in other parts of Polynesia, and those of Peru and Mexico to the east, but reduced the value of his argument by resorting to unfortunate speculations on geological disturbancies. Emory (1934 b), however, shows the complete lack of support for Brown's theory that surrounding fertile land has been submerged, and he claims that the size of the Malden constructions is less impressive than may appear from Dampier's drawing. He is inclined to believe that the prehistoric builders of the Malden structures had come from Raivaevae island, some 1 300 miles to the south-southeast.

Some of the best known Polynesian pyramids are found among those built as tombs for the ancient priest-kings or Tui-Tongas of the Tongan group. McKern (1929, p. 8), in his *Archaeology of Tonga*, divides the structural forms of these elevated tombs into "mounds" and "platforms", according to the steepness of their sides. About the former he says: "Although no Tongan mounds are constructed entirely of stone, many mounds of earth have sides faced with stone retaining walls."

Some of the best local stone work, however, is found among the rectangular stepped Tongan platforms or pyramids. About these the same author writes (*Ibid.*): "The rectangular type includes single platforms and storied platforms, or stepped pyramids. All platforms ... are earth filled enclosures retained by walls of upright slabs in contact at adjoining edges. In some of the smaller structures, the slabs are natural flat pieces roughly broken about the edges and but indifferently fitted together. In most structures, however, the stones of the retaining walls are dressed and sized, producing a smooth, unbroken wall of continuously even height, and fairly even thickness."

The most distinguishable type of *langi* built for the former priest-kings of the Tonga islands consists, according to McKern (*Ibid.*, p. 33), of stepped pyramids composed of "from one to five rectangular platforms, each retained by perpendicular stone walls. Where a plurality of platforms occurs, the smaller are mounted upon the larger in regular succession, according to corresponding differences in lateral dimensions, to form stepped pyramidal structures. Many of these are of imposing size."

The five-stepped pyramid of Katoa, in Mua, Tongatabu, has a base 140 feet long and 120 feet wide, and the largest of the dressed stones of which the vertical sides of the steps are fashioned is 14 feet long, 2 feet thick, and stands just about 6 feet above ground. (*Ibid.*, p. 39.) The neighbouring pyramid of Leka has a base 166 feet long and 140 feet wide, with each of the four steps roughly about a yard deep and a yard wide. All the stones in the walls are comparatively large. One of the carefully dressed stones in the top tier wall is 23.8 feet long, 4.8 feet high and 1.3 feet thick; one in the bottom tier is 24.7 feet long, 3.7 feet high and 1.7 feet thick. "All stones are exceptionally well surfaced and smoothly joined end to end. The corner stones overlap without regard to order." (*Ibid.*, p. 40.)[1]

As shown by McKern, the art of dressed stone construction and the architecture of the *langi* was not in the process of developing when Europeans first arrived, but showed sign of retrogression, as nothing of importance had been contributed by the last generations of Tongan monarchs. Although subsequent Tui-Tongas had kept up the custom of building *langis* for themselves, local tradition assigned some of the best and most highly developed specimens to Tui Tatui, who is one of the earliest progenitors of the Tongan kings, ruling thirty-four generations before 1893, and thus before the great Maori-Polynesian spread from Hawaiki. McKern (*Ibid.*, p. 121) says: "The abrupt, initial occurrence of stone masonry, in a highly developed stage, during the reign of Tui Tatui, as indicated by native tradition, suggests an introduction at that time of the art into Tonga from some outside source; . . ." Failing to find in Samoa anything similar to the langi of the Tonga Islands, McKern turns his attention to Fiji, saying: "The burial mound, as it occurs in Tonga, is not a characteristic feature of Samoa. In Fiji it occurs as a common form of burial place. The mound appears to have been the prototype from which the platform and pyramid tombs were developed."

But Fiji had no stone-shaping art. If we instead turn our attention eastwards we find more striking analogies to the dressed and stepped pyramids of Tonga than the primitive Fijian burial mound. The more elaborate of these rectangular and stepped Tongan *langis* appear to be built in the same style as the main pyramidal structures in Tahiti, and even more on the principles of the stone-faced earthen pyramid of Akapana in Tiahuanaco.

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[1] A single carved stone in another nearby one-step langi is 24.6 feet long, 7.6 feet high, and 2 feet thick narrowing to 1 foot along its top edge. (*Ibid.*, p. 55.) Concerning the three-stepped pyramid of Paepaeotelea in the same cluster of pyramids, McKern (*Ibid.*, p. 52) says: "The individual stones in the lower tier are 8 to 18 feet in length, excepting the L-shaped cornerstone of the southeast corner, which measures 21.3 feet along the eastern side and 6.1 feet along the southern. The northeast cornerstone, also L-shaped, measures 14 feet along the northernmost side and 6 feet along the easternmost." These L-shaped corner-stones recall a feature mentioned above in the lonely outposts of eastern Polynesia, and of the stone-shaping art on the ruined site of Tiahuanaco. (For some of the most elaborate forms of cut stones in Tiahuanaco, see Inwards 1884, Pl. 12—15.)

Speaking of the elements of the early Tongan culture now irrevocably lost to the ethnologist, McKern (*Ibid.*, p. 120) shows by archaeological investigation that the early Tongans were masters in great-stone quarrying and transportation. He even refers to "the occurrence of quarry sites on islands far removed from any building sites, supporting the tradition of the transportation by boat of large stones over considerable water distances; ..." His conclusion is: "The great stone structures of Tonga definitely reflect the strongly centralized socio-political organization of its primitive inhabitants. The existence of a king, holding unlimited sway over a united Tonga, was an historical fact at the time of the discovery of the archipelago by Europeans, and the long rule of a single dynasty of monarchs is clearly pictured in its earlier prime by native tradition. ... The building of the truly colossal stone structures which occur so numerously in the little kingdom involved a tremendous amount of labor, no small degree of skill, and a considerable expenditure of time. Long years of training, well organized effort, and absolute control of labor under a directing head were essential factors necessary to enable the successful construction of one of the larger langis."

An important detail of some of the Tongan pyramids is that they were occasionally ascended by ramps or stairways. McKern (*Ibid.*, p. 8) says: "The tops of some mounds and platforms were made accessible by roadways, or approaches, ascending gradually from the surrounding land—the length of the roadway being determined by the height of the structure. Most of these approaches were supported on either side by retaining walls, similar to the walls of the main structure. A few were paved with stone slabs or rough fragments of stone, or surfaced with gravel. Access to certain platforms was by means of low stone steps placed at certain points against the retaining walls. Where the low steps adjoin relatively high walls, they seem merely to have marked the proper place for mounting rather than to have afforded help in ascending the structure."

To the top of the five-stepped pyramid of Katoa two stair-like ramps ascend, evenly placed exactly opposite each other in the centre of the east and west side of the pyramid respectively. (*Ibid.*, p. 39, Pl. 2 A.) On the almost even-sided langi of Olovehi at Lifuka Island a ramp is constructed only on one side, leading to the upper platform in the form of stone steps. This feature also is strikingly reminiscent of so many of the pyramidal structures of early Mexico and Peru. Leicht (1944, p. 204) describes the three-stepped pyramid near Etén in North Peru, which has a base of roughly 300 by 200 feet and is ascended by a continuous stairway to the top platform. The author claims that this feature of early architecture on the coast of North Peru clearly demonstrates the cultural relationship with Central America. Kroeber also (1930 a, p. 109) points out that certain of the larger stepped pyramids of the Early Chimu period "were sometimes approached by ramps."

It is noteworthy that the North Peruvians of the Late Chimu period, while modifying the architecture of the larger terraced pyramids of the classic Early Chimu period, attained results very similar to those occasionally found in Tonga. Kroeber (*Ibid.*) says: "Pyramids in this Late era no longer attained the height of the largest Early Chimu ones. Their broad tops, probably their interiors also, served as cemeteries. Often the whole structure seems little else than an elevated platform for burials. The sides were steep; terraces, if present narrow; ramp approaches, frequent, and sidling as well as direct. Clusters of pyramids were more usual than in the Early period."

The fundamental idea of a step-shaped and elevated stone-platform as a religious structure has a wider distribution in Polynesia than the *marae* or rectangular upright enclosure described earlier. It is probably to be seen in a modified form in the *ahu* of Easter Island and the *pae-pae* of the Marquesas group. Buck (1938 b) and Emory (1939) describe it as having three or occasionally four steps respectively in Mangareva and Timoe to the far east; and, although both the *marae* and cut-stone work are absent from Samoa to the west, the Samoan *tia* is a rectangular cairn consisting of up to three step-formed tiers of natural boulders raised over the grave of a high chief. (Buck 1930, pp. 322, 691.)

From the time when Lang (1834, pp. 101, 103) pointed out that the South Americans and Polynesians built no roofed temples, but solid mounds with steps, the concurrence of the pyramids and pyramidal platforms of these two geographically adjacent areas have with brief intervals been pointed out. The opposition among some of the Polynesianists, however, has regarded this correspondence as a superficial similarity, claiming the size as well as the purpose of the pyramids to be entirely different in the two areas. Their objection may be based partly on inadequate information regarding the pyramids of *Peru*, for the great dimensions of Akapana and the Pyramids of the Sun and the Moon should be judged against the background of a numerous mainland population, and even so they do not represent the average of stepped pyramidal edifices in Peru. The larger stepped pyramids of Tahiti, Tonga, and the related form in Hawaii, are in magnitude, conception, and working method well within the limits of the average comparable structures of early Mexico and Peru.

One can also occasionally hear the argument that the Polynesian pyramids were erected to serve for worship, while those of Peru were intended merely as tombs. I have also heard this argument exactly reversed. But it is hardly possible to find foundation for such a distinction, since the natives in the two areas apparently saw no grounds for separating one of these purposes from the other. We have seen with Benzoni how stepped pyramids were built for the purpose of worship in aboriginal Peru, a custom familiar also in early Mexico, where a small temple was commonly raised on the upper terrace. Yet we have seen with Kroeber how early Peruvian burials were often made in the very same type of ecclesiastic building, some of the pyramids being expressly raised to serve as cemeteries or burial platforms. As in early America, so also in Polynesia, the pyramids seem to have served either purpose, or occasionally both purposes at the same time. This was first pointed out by Byron (1826, p. 25) more than a century ago, when he wrote upon his visit to Hawaii: "The morais were both temples and repositories for the dead. Garcilasso de la Vega, in his Conquest of Florida, mentions that the temples were repositories for the dead, and also treasuries for the reception of the more costly goods of the Indians."

We saw how in Hawaii Cook was led straight to the top of a pyramid where there was erected a little wooden house for worship. Yet there is evidence to indicate that some Hawaiian stepped pyramids were used as restingplaces for dead chiefs until the high priest was "informed by the gods" that he must remove them to their final resting-place in some designated cave. (McAllister 1933, p. 124.)

The Society Islands' pyramids were temples of worship, occasionally, as Cook observed, with effigies on the top platform. Yet Forster (1777, Vol. I, p. 267) says of at least one of these pyramids that: "This the native said was a burying-place and place of worship, Marai, . . ."

In Tonga, as McKern (1929, p. 33) shows, all the stepped and truncated pyramids were raised as tombs for important members of the Tui-Tonga family, and: "One or more stone vaults, entered from the flat top of the structure, are present in most langis, but there are exceptions to this rule." He also shows how Cook speaks of wooden effigies erected on top of a *langi* he saw at Mua, Tongatabu. Furthermore, he describes small huts, occasionally of stone, that stood on top of some of the pyramids. According to d'Urville, who visited these pyramids a hundred years earlier, these huts were places for prayer—or spirit-houses. (See Plate LIX **6**.)

From Mangareva Emory (1939) speaks of terraced platforms with three steps, the largest having been used for burials in small vaults on the top. Yet they served as temples also. A large sacred *pae-pae* inspected by the present author in the Marquesas group (Hanavave) and formerly used for religious worship had an entrance from the top of the platform into a stone-lined burial vault. According to the early travellers the *ahus* of Easter Island seemed at the time of discovery to serve a combined purpose of worship and burial. Vaults were found in some of them.

Since the hierarchy and chiefly families in Peru and parts of Polynesia were considered more than human, and since the worship of royal ancestors was so pronounced, we may well understand why there is so close a connection between the temple of ancestor worship and the tomb of the kings in both areas. The functions of the South American pyramids are directly repeated in Polynesia.[1]

Cyclopean stone gateway as religious structure

There is one more megalithic construction in Polynesia of a type not yet dealt with; the cyclopean gateway of Tongatabu. Raised as a large trilithon, it was not part of a temple, nor the entrance through any wall or other construction, but stood alone, in all likelihood a monument at which religious rites were practised. (Plate LXI **2**.)

McKern (1929, p. 63) gives the following dimensions to the three stones of which the gateway is made: the western upright is 17 feet high, 14 feet wide at the base and 12 feet at the top, with an average thickness of 4.5 feet. The eastern upright is 15.5 feet high, 13.5 feet wide at the base and 11.3 feet at the top, with an average thickness of 4.5 feet. The lintel is 19 feet long, 4.5 feet wide, and 2 feet thick. An interval of 12.5 feet separates the

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[1] Posnansky (1913) has analysed the constantly reappearing stairway-sign or step-symbol in Tiahuanaco art, as expressed also in local ecclesiastic architecture like the cyclopean stairway and the Akapana pyramid. He shows the symbol to be that of the heavens in relation to earth. If this be correct it is interesting to note that the Tongan term for their stepped pyramids is *langi*, which is the general Polynesian term for "heaven". It may be true, as some writers suggest, that certain of the stepped megalithic terraces and hill-side platforms which abound in Peru and Polynesia, when occasionally constructed as a religious structure rather than for agricultural purposes, may represent an evolution from the stepped pyramid under hilly and mountainous conditions. Some of these superposed terraces, like those covering mountain summits of Rapa-iti island, contain single stones eight feet long and six feet high. (Churchill 1912.)

On Easter Island Routledge (1919, p. 194) discovered remnants of a prehistoric road nearly seven miles long and from nine to ten feet wide. It was traceable from the foot of Rano-Raraku, where the image quarry was, almost to the top-knot quarry at Rano Kao. The embankments of the early road were found to be still often two feet above the ground, and the cuttings three feet deep. Several other roads branch in various directions from the image mountain, and on this tiny island Routledge shows nearly twenty miles of intersecting roadways. Rano-Raraku, she says, was formerly "approached by at least three magnificent avenues, on each of which the pilgrim was greeted at intervals by a stone giant guarding the way to the sacred mountain."

Writers with more imagination than insight into local geology have suggested that the Easter Island roads might once have continued below what is to-day the ocean surface. Actually, the few roads that reach as far as to the sea terminate there in a deep ledge-shaped landing-place. Even Brown (1924, p. 69) observed this fact, which seems rather incompatible with his speculations on submergences: "There are paved ways or slides down to the sea close to several of the great platforms, ... it is so broad and the stones so carefully fitted and at the foot of it the tide so deep, that there would be no difficulty in hauling up even a double canoe. Or if rafts were used, like in Mangarewa, for transporting the great beams to the island, their unloading would be accomplished without difficulty."

Again Routledge (1919, p. 198) says: "Besides the ceremonial roads and their continuations, there are traces of an altogether different track which is said to run round the whole seaboard of the island. It is considered to be supernatural work, and is known as Ara Mahiva, 'ara' meaning road and 'Mahiva' being the name of the spirit or deity who made it. On the southern side it has been obliterated in making the present track—it was there termed the 'path for carrying fish'; but on the northern and western coasts, where for much of the way it runs to the top of high cliffs, such a use is out of the question. It can be frequently seen there as a long persistent furrow, and where its course has been interrupted by erosion, no fresh track has been made further inland; it terminates suddenly on the broken edge, and resumes its course on the other side. ... This silent witness to a forgotten past is one of the most mysterious and impressive things on the island."

It is perhaps not unlikely that sections of these roads to som extent facilitated the transportation of the statues and great stones over the rugged island surface. It is noteworthy that Thomson (1889, p. 519), long before Routledge's discoveries, heard the following recital from one of the native Easter Islanders: "When the island was first created and became known to our forefathers, the land was crossed with roads beautifully paved with flat stones. The stones were laid close together so artistically that no rough edges were exposed."

Emory (1939, p. 16) shows that in the Mangareva group west of Easter Island there are also remains of prehistoric roads connecting one bay with another. These are paved in certain areas with "flat-topped basalt stones, with an occasional one of coral or limestone, fitted closely together over a width of from 3 to 6 feet." The same author (1934 b, p. 40) shows that on both Raivaevae and the lonely uninhabited Malden, paved roads lead to the sea from most of the *maraes*. A good example of this strange island engineering is also seen in the beautifully paved approach to the Marae of Tongaroa on Rarotonga.

McAllister (1933, p. 34) says regarding Hawaii: "The Hawaiians had in some places paved trails which consisted of large flat stones placed end to end. Broader trails were apparently made in well-populated districts." He shows (*Ibid.*, p. 186) that the paved way leading to the ruins of the 140 feet wide and 30 feet high temple platform of Ulupo, Oahu, is called by the natives the "Menehune pathway".

We have seen with McKern how short paved ways also approach some of the Tongan pyramids, and the same author says (1929, p. 89): "Not least among the structural peculiarities of Tonga are the sunken roads. . . . Two of these peculiar highways were examined. Halamate (*hala*, road; *mate*, dead), probably a recent appellative, extends lengthwise from end to end of the island of Ualeva, Haapai, a distance of several miles. It has the appearance of a square-bottomed ditch with the removed earth banked on either side. Its dimensions are 2 to 3 feet in depth, 6 feet in width at the bottom and 12 feet across the top from bank to bank. The course, as marked by a heavy growth of shrubbery along the bottom and sides of the road, follows a consistently straight direction. The other road ascends the western slope of the hill Kafoa on the island of Vavau. It rises straight from the Pangaliki shore to the ridge top just below the hill. The floor of this square-bottomed excavation is about 3 feet wide and is 6 feet below the tops of the lateral embankments. The embankments stand at an angle of about 45°."

Buck (1930, p. 323) describes prehistoric roads on Savaii and Upolu, in the Samoan group, some of which are said to have been made under an early Tongan rule, whereas others have a purely mythical origin.

In the Marquesas group and other Polynesian islands also we find isolated occurrences of artificial roads and paved ways, some of which might well have served pedestrian traffic, whereas others can only be explained as religious constructions intended solely for ceremonial purposes.

It is unlikely that seafarers invented paved road engineering independently on all these scattered islands, and it would clearly be much more natural if the islanders had merely continued a custom brought from a nearby continental empire. It is well known that road construction was a widespread and important feature of the American high-cultures from Mexico in the north and right down to the Andean regions of north-western South America. Bennett (in Steward 1949, p. 54) says:

"In the Northern Andes short stone-paved roads are found in the Tairona villages of Santa Marta, Colombia, . . . In the Central Andes, the *Inca* were famed for their roads. It is highly probable that roads were built in much earlier periods, but archaeological confirmation of this is lacking. The *Inca*, however, maintained a network of roads which covered the four principal divisions of their Empire.

"The Chinchaysuyu system extended north through the mountains from Cuzco to Vilcas, Huánuco Viejo, Cajamarca, Quito, and Huaca. A side branch went to Pachacamac and from there up the Coast of Perú to Tumbes in the north. The Collasuyu system went south from Cuzco, passing Lake Titicaca and Lake Poopó in Bolivia, then inland to Chuquisaca, Santiago del Estero, La Rioja, and Mendoza in Northwest Argentina, and then westward to the coast of Chile. A branch line ran to Arequipa and from there south to Calama, Copiapó, and the Río Maule in Chile. The Cuntisuyu system connected Cuzco and the Nazca region on the South Coast of Perú, and the Antisuyu system extended east of Cuzco into the Amazon drainage. These roads were used by the army, by travellers, by llama transport herds, and by the famous relay messenger runners. In the mountains, they were narrow, about 3 feet in width, and either stone-paved or lined with walls. On the Coast, the roads were as much as 12 or 15 feet in width, and lined with walls. Across desert stretches, posts were set at intervals to mark the course of the road." (See also Mostny 1949, p. 178.) An interesting illustration of a Tairona paved road in the northern Andes is reproduced by Mason (1931, Pl. 17).

We have seen that some at least of these roads are referred to in Inca traditions dealing with the time when the Viracochas inhabited the Tiahuanaco site, and we have also seen that prehistoric road-construction in Colombia as well as in Mexico was attributed to the white and bearded Bochica and Quetzalcoatl respectively. (Part V.)

Thompson (1928, p. 181), describing the paved prehistoric roads found among the wheel-less aborigines of Yucatan, writes: "They are indeed a striking monument to the immense patience, engineering skill, and industry of the Maya people." They were, he shows, up to 60 feet wide, paved and raised a foot or so, although in swampy land they might be raised as much as eight feet. Some of them were many miles long, linking ruined sites and cities, and the author suggests that they were made for ceremonial use.

Stone towers and subterranean chambers

Of less importance are the cylindrical towers of irregular stones, with square entrances, found on some of the cliffs of Easter Island. (Routledge 1919.) Many theories as to their origin and purpose have been advanced by visitors, the theories ranging from sacred dwellings to watch-towers for turtle-hunters. Quite similar cylindrical stone towers with low square entrances are very common in the Titicaca basin, where some of the early explorers found they had been used for burials. (Gutiérrez 1935; Tschopik 1946.)

In the same connection may be mentioned the most peculiar subterranean galleries on Easter Island, which recur in a strikingly similar form in the hills around Tiahuanaco. Here, precisely as on Easter Island, they are often built as a circular chamber under the surface, lined with stones and covered by large flat slabs and earth. In both areas access is obtained through a narrow, stone-lined opening about eighteen inches square; paintings are occasionally found on the interior walls. (Routledge 1919; McMillin 1927.)[1]

We may also note that the stone-lined prehistoric burial vaults found by Routledge (1919, p. 275) on Easter Island, like those of the chiefly mounds and pyramids in Tonga (McKern 1929, p. 32), and those found in stone platforms on the Marquesas (Heyerdahl 1938), Hawaii (Linton 1923, p. 456), Mangareva (Emory 1939), and perhaps a few other islands, all find their counterparts in the stone-lined burial vaults common enough in early Peru; whereas we have seen (Part II) that the main bulk of historically known Maori-Polynesians followed the burial customs adhered to on the Northwest American coast.[2]

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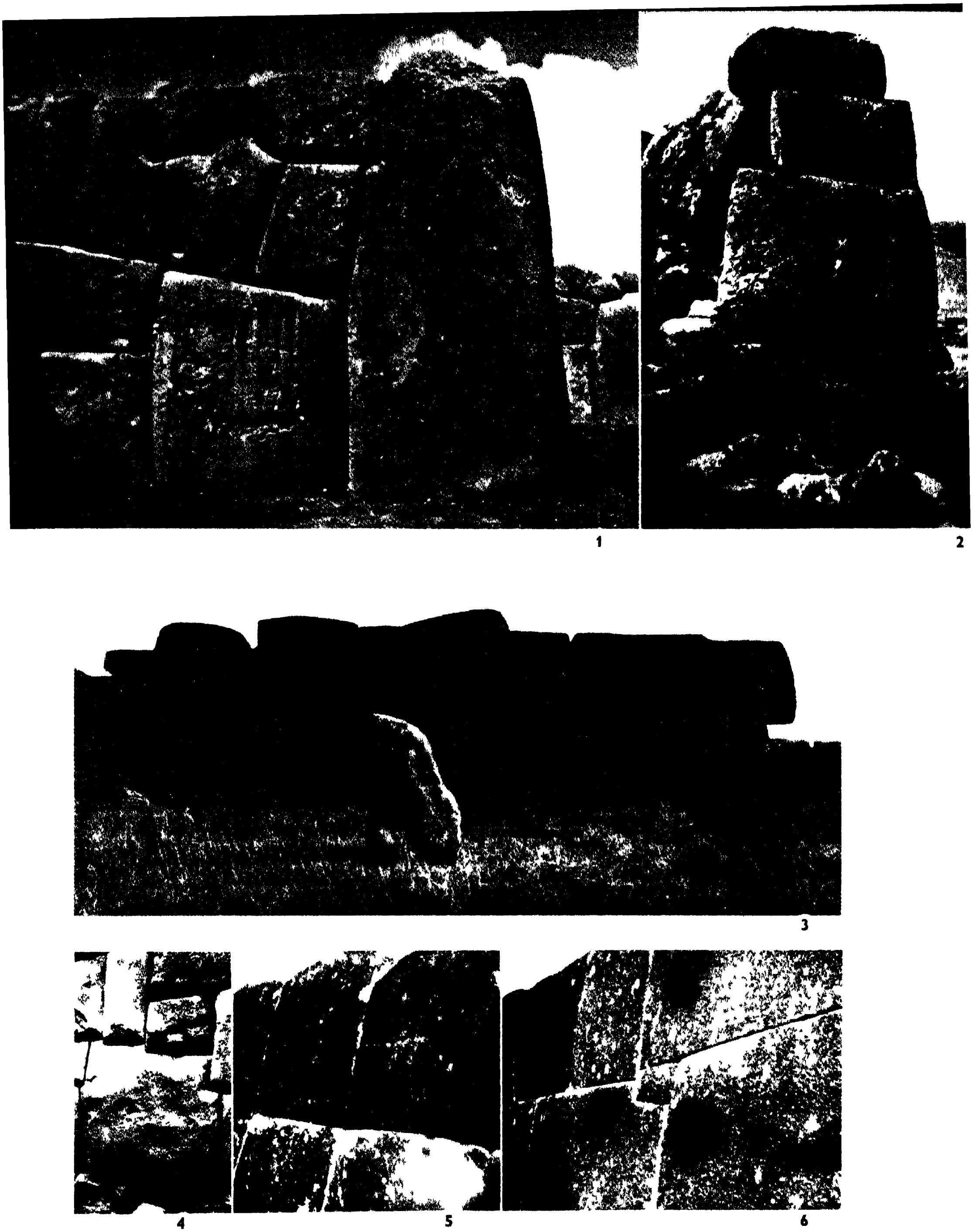
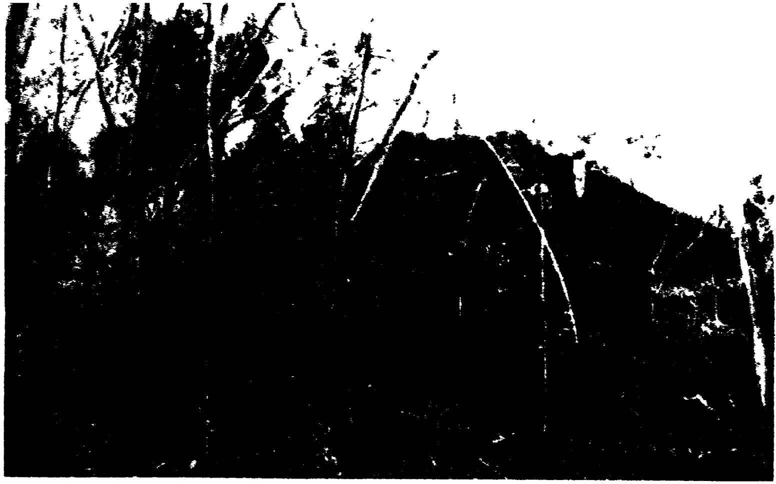
[1] I have seen the same type of circular, subterranean chamber, with narrow, square entrance in the roof and with mural paintings on the adobe walls, in an old native *Kiwa* near Bernalillo in New Mexico. This place, like the subterranean *Kiwas* still in use by Indians in this locality, was built as a sacred place where the men gathered to sing and perform religious ceremonies.

[2] McKern (*Ibid.*) quotes Guttenbeil regarding a prehistoric Tongan burial vault on Niuatoputapu island which had a flat and smoothly dressed stone lid 15 feet long and 10 feet wide. It was so heavy that all attempts to move it



Prehistoric cut-stone masonry of South America and East Polynesia. **1** Sacsahuaman, Peru. (Photo: *H. Ubbelohde-Doering*.) **2** Easter Island. (From *Lavachery 1935*.) **3, 5, 6** sections of walls at Vinapu, Easter Island. (From *Brown 1924*; *Routledge 1919*.) **4** Cuzco, Peru.



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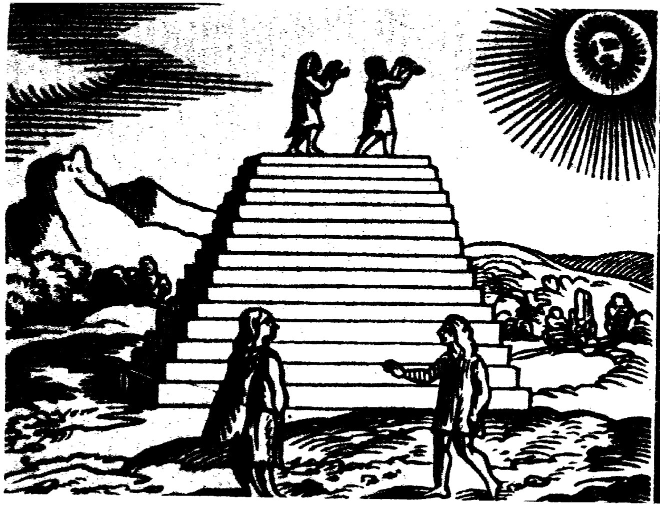
Stepped pyramidal platforms as religious structures in America and Polynesia. **1** Totonac temple near Vera Cruz, Mexico. (From *Fewkes 1904*). **2** Early Chimu temple and burial place, the "Pyramid of the Sun", Pacific North Peru. (From *Kroeber 1921.*) **3** Temple and burial place at Papara, Tahiti. (From *Wilson 1799.*) **4** Ruins of *Paipai*, stone-lined pyramid at Tongatabu Island. (From *McKern 1927.*)



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Before the arrival of Europeans stepped pyramidal platforms served as temples for worship as well as burial places for chiefs both in Peru and Polynesia. **5** Ecclesiastical architecture in aboriginal Peru. (From *Benzoni 1565*.) **6** A tomb for priest-kings in the Tonga group. (From *Wilson 1799*.) **7** Low pyramidal platform on uninhabited Malden Island. (From *Byron 1826*.) **8** Cyclopean cut-stones of Tongatabu royal tomb. (From *Brown 1924*.)

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Uprights marking **1** the Andean temple enclosure Kalasasaya, at Tiahuanaco (photo: *Toucan Press-Wegeesch*), and **2** a marae or temple enclosure in Tongareva, Polynesia (photo: *B. P. Bishop Museum*). This, and the stepped pyramid, are the two basic forms of temple construction in aboriginal Peru and Polynesia.

The tongan pottery fragments

We have seen (Part II) how the manufacture of pottery was totally absent from all Polynesian communities when Europeans arrived, in spite of the existence of clay in most of the principal groups, and in spite of the very recent arrival of the Maori-Polynesian immigrants. We have also seen that this most remarkable fact can only be explained by bringing the present occupants of Polynesia down from the Northwest American territory, where the entire coastal population remained ignorant of the use of pottery until it was introduced by Europeans, whereas it was common to all other important culture centres of the Pacific coasts with the exception of the southern extremity of South America. This migration route alone will explain why food was baked in earth ovens throughout historic Polynesia, while ceramic art was absent.

But the question remains whether the earlier megalithic island culture had been equally neglectful of this ancient and almost universal culture trait. We know that if the earlier people had made pots to boil their food in water, this would not have appealed to the taste of the invading Maori-Polynesians, for the occupants of the islands even in our day continue to bake their food in the Northwest Indian Polynesian earth ovens, disregarding European methods. They use calabash or other containers to carry their water. The Polynesians were desperately eager to acquire bits of iron and sharp metal tools when such articles were first brought to their attention by Europeans, but they preferred their own ancestral cookery to that which they saw among the white men. Likewise, the many Polynesian expeditions that visited Fiji in pre-European times took no interest in importing the Fijian custom of manufacturing pottery. Thus, if another culture had occupied the islands before the Maori-Polynesians arrived, these people might have known how to make pottery without passing the practice on to the pottery-less newcomers.

Whether the earlier island population came from Asia (with Indonesia) or from Peru, it would seem equally impossible that they, having otherwise an advanced culture, were ignorant of pottery in the early Christian centuries, but we have suspiciously little evidence that pottery-making was actually known in the early megalithic island era. Disregarding an unverified native report on potsherds from an ancient Marquesan *pae-pae*, and the equally unverified report of actual pottery having been seen on Easter Island when first discovered (Behrens 1737, p. 135), no concrete evidence exists, apart perhaps from the prehistoric fragments of pottery excavated on Tonga (McKern 1929, p. 115; MacLachlan 1938, p. 65). The present Tongans, of course, had no pottery. But some three thousand prehistoric fragments have been recovered archaeologically on four separate Tongan sites, namely in Tongatabu, Eua, Pangaemotu, and Matutapu. The colour of these fragments was black and red-brown, much as in Fiji. No equivalent discoveries are recorded from other areas of Polynesia, but prehistoric fragments have also been discovered with the megalithic remains on the Mariana Islands, a fact to which we shall return shortly.

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failed, and one end was finally cut off to afford an opening. A skeleton lay prone in the centre, others had been sitting around the slab-walls, and the floor was covered with a very deep layer of fine dark dust probably from smouldered organic materials.

Stone monuments of Indonesia

Megalithic monuments of some sort have been left by prehistoric people in various early centres of the world, and one school of diffusionists has attempted to unite all such remains in a common Eurasiatic origin. It is not the purpose of the present study to dwell on these theories, but only to consider the material which in one way or another bears directly on the question of the prehistoric peopling of Polynesia. The Egyptian sphinx and obelisks have but little in common with the easily distinguishable Polynesian anthropoliths as compared with the stone human statues of Tiahuanaco and San Augustín, and the square-based, pointed pyramids of the Nile are remote from the rectangular, terraced pyramidal structures of Polynesia in style, concept and geographic location; but those of Mexico and Peru are indeed very near. It will, however, be necessary to consider the megalithic occurrences in inner Assam and parts of Indonesia, since certain diffusionists have suggested that these may give the clue to the megaliths of Eastern Polynesia.

Disregarding for a moment the geographical complications, we shall travel as the crow flies 90-100 degrees round the surface of the globe from the westernmost Polynesian anthropoliths, found in the Tubuai Group, to their nearest counterparts in Celebes and South Sumatra. Our best source of information on these megalithic sculptures appears to be the interesting work by van der Hoop (1932). Besides giving detailed descriptions, Hoop reproduces an excellent series of photographs. The first impression offered by some of these Indonesian stone sculptures is the same bulky structure with a large head as has already been described from America and Polynesia; a few even have extended ears, with a large circular nugget, as in corresponding monuments from Southern Mexico. On the whole, there is a markedly stronger similarity to South Mexican anthropomorphic megaliths, carved stelae, and stone troughs, than to the erect columnar stone human statues of South America and Polynesia. A number of the Sumatra carvings even display a specific similarity to the ancient Olmec megaliths of Southern Mexico, as may be seen by comparing the two figures on Plate LXII **1** and **2**. On further examination, however, a number of additional features are found in the Indonesian specimens which give them a marked Asiatic stamp and distinguish them clearly as later than Olmec work and knowledge.

Hoop (*Ibid.*, p. 67) says with reference to the 53 anthropomorphic images found: "Frequently these figures are represented with a buffalo; frequently also riding on, standing beside, or in combat with an elephant." Also (p. 74): "As regards the animals represented, we may remark that the elephant is sometimes portrayed as an animal for riding on and sometimes also in combat with Man, but never singly. In one single instance, the buffalo is represented singly, and also frequently as an animal for riding on. ... It is remarkable that the buffalo is so often represented as riding-animal. This custom occurs in other parts of the world. In Central Asia, the Yak is used not only as beast of burden but also as riding-animal."

We also hear (p. 27) of a damaged monument where "it is still possible to distinguish three human figures, twisted together as if engaged in wrestling. One of the heads is quite discernible while a sword can be seen on the back of another man." Further (p. 74): "Swords occur with seven different images." We learn (p. 92) that these swords, alien to early America and Polynesia, resemble in their bilateral symmetry the Roman sword, whereas their short and very broad blades make them concur with a form of weapon "met with in various parts of the earth in the *bronze periods*." (Italics by Hoop.)

In this and a subsequent publication Hoop (1933, p. 104) also shows that "much stress is laid on the representation on one of the images at Batoegadja of a bronze drum of well-known type generally regarded as of southern Chinese origin." The author gives much attention (1932, pp. 81-92) to the carving of this identifiable kettle-drum (which occurs in a sculpture including an armoured elephant) as it "assists us enormously in estimating the antiquity of the images." Hoop proceeds to show that about twenty similar kettle-drums were found in the Dong-son graves of Indo-China, probably dating from the Han period (206 B. C. to 220 A. D.)[1] In the same Dong-son graves swords strongly resembling those carved on the Sumatra images also occur, as well as other bronze artifacts corresponding to actual finds in graves associated with the same Indonesian megaliths.

He concludes (*Ibid.*, p. 94): "When we now consider, on one side, the images of the Pasemah [in South Sumatra] and the bronze remains found in South Sumatra and other parts of the Archipelago, and on the other side, the bronze culture of Indo-China, then we may safely assert that the sculptors of the Pasemah had a bronze culture corresponding with that of Indo-China. It may be explained thus that the bronze objects were exported to South Sumatra from Indo-China. The number and variety of the bronze objects, however, found in the archipelago, but more especially the communication made by Dr. Crucq [who found archaeologically a mould for kettle-drums in Bali] make it more probable that the art of casting bronze was also exercised in the Archipelago itself."

Hoop points out that no stone tools were found during the investigation of the sites; the only stone axes collected had been found in the neighbourhood by natives while tilling the soil. He says (*Ibid.*, p. 95): "It would appear, however, from the finding of 'Controleur' Batenburg, that in the Pasemah, as in Indo-China, iron was already known. It is therefore possible that the sculptors employed iron tools. If stone implements have been used these must have been rougher, heavier and less finely executed than those we collected."

It is clear from Hoop's accumulation of evidence, as the author himself stresses, that the Sumatra sculptors had no neolithic culture, but were familiar with the use of bronze. The art of casting bronze was probably either brought with them or borrowed from India or Indo-China. This in itself presents a marked contrast to the Olmec and other pre-Aztec and early Maya cultures,[2] as well as to those of Early Chimu, Paracas, Tiahuanaco, and other South American high-cultures contemporary with Polynesian migrations. Bronze in American was a much later feature, and even then of a limited distribution.

Archaeological evidence from the stone-cist graves associated with the great Sumatran images verifies that, not only was bronze known to this megalithic culture, but iron too had been introduced to a limited extent. (Hoop 1932, p. 47.)[3]

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[1] Hoop (*Ibid.*, p. 83) says: "The area over which the kettle-drum is found, includes the whole of South Eastern Asia, with Burma and Insulinde, and extends in the North to Mongolia."

[2] In the Old Maya Empire metal was non-existent. (Morley 1946, p. 449.) Even in the New Empire only neolithic tools were used, although personal ornaments and ceremonial objects were now also made of gold, copper and their alloys, and eventually bronze shortly before European arrival.

[3] Heine-Geldern (1945, p. 150) points out: "...all the stone cist graves and slab built graves of South Sumatra, Central and East Java contained glass beads and metal, bronze, gold, copper or iron. The same was the case in similar graves that have been investigated in the Malay Peninsula."

It is interesting to note that the almost Negroid physiognomy of the Sumatran stone images has caused the belief among some observers that the race which carved these prehistoric monuments might have been Negroid or Melanesian. Hoop (*Ibid.*, p. 77) meets this theory by stating: "If there is insufficient anthropological ground for such a conclusion, from an ethnological standpoint there are positive arguments against it. The Megalith builders in South Sumatra lived, as will be demonstrated later, in the bronze period. They possessed swords and large bronze drums. They wore a rather complicated dress. They adorned themselves with various ornaments, including glass beads in various forms and combinations; they were not ignorant of pottery; they could tame buffaloes and elephants; in the art of sculpture they were well masters; they constructed baths or other water-works, as is apparent from the gargoyle at Pageralam."

The Melanesians and Papuans on the other hand, the author points out, "have never reached the bronze period. They passed from the well-known stone implements to modern import articles. ... The Melanesians have for weapons wooden clubs and spears, the latter with points of stone or bone. For the rest, they only know the bow and arrow. Metals were unknown before the advent of modern import articles. They do not know the buffalo as domestic animal and the elephant as riding animal. It seems clear, then, that *all* eastern Negroid peoples, or eastern Melanoderms or oceanic negroes, or whatever one likes to call them, stand on a much lower cultural level than our sculptors of South Sumatra." The same argument applies in its essentials not only to the Melanesians, but also to the Polynesians.

Hoop (*Ibid.*, pp. 79, 155) carefully refrains from giving an answer to the question as to which race built the megaliths of South Sumatra. But he tends to the opinion that the physiognomy of the flat and wide-nosed, thick-lipped images "may just as well represent a Malayan type."[1]

Hoop (*Ibid.*, p. 95) shows that stone ancestral images, differing somewhat in style from those of South Sumatra, are known also from the Batak-Lands (*Pananggalan*, *Salak*, *Si Aboe*, *Djamboe*, *Si Antar*): "These are images of men and women on horses and elephants, and also without a riding-animal. They were comparatively recently erected for deceased rajahs, after the last great festival of the dead." Some very primitive stone images are known from Nias and a few other areas. Finally, Hoop (*Ibid.*, p. 96) refers to certain stone statues discovered in the interior hills of Celebes. He describes them as rough upright stones with nothing outlined but primitively shaped heads and genitalia. In all they were "sculptured very roughly and in primitive fashion."

Kaudern (1921) illustrates some others of these pillar-shaped and large-headed Celebes statues, which to the present author would seem to be the only ones west of Polynesia similar enough to those of the East Pacific and South America to warrant a test of kinship with that distant area. However, as both Hoop and Kaudern, with other observers, point out, the Celebes figures are only accessory to a culture whose characteristic feature was the carving of megalithic stone kettles with enormous disc-shaped stone lids, known respectively as *kalamba* and *toetoena*, megalithic constructions of a type wholly unknown in Polynesia and America.[1]

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[1] If a parallel may be seen in the strongly similar Olmec sculptures of Southern Mexico, it is highly conceivable that the flat-nosed, thick-lipped aspect of a genuine Yellow-brown tribe has been the model of the sculptor in both areas. In primitive sculpture, which does not portray hair and skin-colour, the physiognomy of Yellow-brown tribes will certainly concur much more with the Negroid features than with those of the Caucasoid type.

We have finally to consider some of the small statuettes or portable stone human (and elephant) figures a number of which have been found, principally in Java. Hoop (1932, p. 99) shows that although these usually were known as images of the "Padjadjaran-type", one writer had tentatively referred to them using "the more general name of Polynesian images", a term which is geographically and chronologically unjustified. Chronologically the figures are severed from East Polynesia (West Polynesia had no statuettes) through the following dating by the same author (*Ibid.*): "It is clear that the sculptors of these artless products have not escaped the influence of the powerful civilization which had spread over the plains. This is proved, in the first place, from the awkward attempts frequently made to make these images resemble prototypes from the Hindu pantheon. Ganeça, especially, seems to have exercised great influence. The second proof is still more instructive, and is supplied by the dates on a few of the images, dates in the characters of the Hindu-Javanese Kawi script. The most remarkable thing is that these dates are comparatively late, not earlier than the 14th century. From this may be deduced that these clumsy representations were executed, and the sacred places ornamented with them, during the resplendent period of the Madjapahit Kingdom and the last days of the Hindu-Javanese civilization, and in any case, that it would be a great mistake to regard them as the products of the Javanese population when they first came into contact with the culture of the Hindus, just arrived from oversea."

These small Hindu-inspired stone figures are not so carved that they could be mistaken for carvings from any of the East Polynesian groups, but it should be admitted that a number of them, such as a kneeling figure holding a bowl between its hands, are remarkably suggestive of early Mexican and Central American statuettes.

Indeed the existence of a limited number of small and recent stone images in Java and its vicinity has no ultimate bearing on the origin of statuettes of comparable size on the far fringe of the easternmost Polynesian islands (distant up wind by some 90 to 130 degrees of longitude) unless they, at least, have an obvious resemblance in style and concept to the images of this area. As this is not so, their significance in Polynesian archaeology is forced, and the more so when we realize that vast quantities of comparable small stone human images, some strikingly similar to those of Eastern Polynesia, are found all along the Pacific slopes of Mexico, Guatemala, San Salvador, etc., right down to Colombia, Ecuador, and pre-Inca Peru, all bordering on the waters of Eastern Polynesia. (See Plate LI.) In the latter case neither geography nor chronology form any obstacles to a down-wind diffusion.

Hoop (*Ibid.*, p. 101) is also careful enough to warn his readers against the danger of associating the small Indonesian stone figures with those found in the remotest islands of Polynesia, as long as proof in the shape of other cultural relics or human remains are wanting. He stresses: "... the fact that one has discovered two analogous works of sculpture in different places, is in itself no proof that these works belong to the same culture or are the products of the same race. ... We forget also too easily the factor of distance in these regions and this is enhanced when data are jotted down on small survey-maps. The marks denoting remains found, then naturally lie close together, thus easily suggesting an association which is by no means proved."

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[1] Hoop (*Ibid.*, p. 157) points to somewhat comparable stone mortars in Sumatra and other parts of Indonesia.

Beyer, who held that the *Northern Philippines* and *not* Sumatra or Java, must be suspected of being the Polynesian Fatherland, to judge by a prototype relationship in archaeological stone-adze blades (p. 108 above), dismissed the Java route thus (1948, p. 36): "The total absence in Polynesia of the 'beaked' adze, so characteristic of Java and the Malay Peninsula, seems to favor the northern route and to eliminate the Sunda Islands from the line of Polynesian migration." But when we come to consider another important element of the neolithic culture of Polynesia, namely the stone human statues of the far eastern groups, then the Philippine area in turn fails to make good as a possible centre of diffusion to the east. On this issue Beyer (*Ibid.*, p. 74) says:

"Huge stone figures and effigies, such as those on Easter Island, and the curious monoliths and megaliths of the Marianas and other Pacific Island groups, all seem to constitute an interesting feature of the Late Neolithic culture that is but poorly represented, if not wholly absent, in the Philippines."

When we look back on the megalithic and small stone sculptures of Indonesia, we see not only that a very great portion of the world's surface separates them from eastern Polynesia, but that they are associated with a bronze age culture, or else with the *kalámba*-and-*toetoena* complex, and other cultural characteristics incompatible with Polynesian-South American archaeology. But over and above these discrepancies there is a basic difference in artistic style. The freedom seen to some extent in the carving of the early stelae of Mexico and Yucatan has stiffened in South America into an increasingly pillar-like or columnar effect, found from San Augustín and Ecuador down through Chavín, Huaraz, Pukara, Mocachi, Tiahuanaco and Huancané. This stiff, pillar-like effect has been preserved on all the Polynesian islands, where the statues and statuettes, as in early South America, all stand in a stiff and conventional posture, staring straight ahead, their hands generally placed below the chest. In Indonesian stone carving, apart from the few upright stones in Celebes, this effect is generally entirely reserved.

Summarizing Hoop's megalithic discoveries, Heine-Geldern (1945, p. 149) describes these monuments as follows: "A considerable number of large stone images of a strongly dynamic, agitated style; the very images which Westenenk and other authors had previously referred to as remains of the Hindu period. They represent warriors with helmets and daggers, groups of two or three people, men riding on elephants or buffaloes, an elephant with a warrior on each side, both warriors carrying bronze drums of their backs, a man fighting an elephant, two men fighting a serpent, two tigers pairing, the tigress clutching with her fore paws the head of a human figure, etc."

This dynamic, agitated style marks a pronounced contrast to the megalith art of Eastern Polynesia.

The stone structures in the Naga Hills

Going still further back to the mainland of India, we meet the megaliths in the Naga Hills in the interior of Assam, described by Hutton in his various publications (1921 a; 1921 b; 1922 a; 1922 b; 1926). These carved and raised stones have very little, if anything, in common with the monoliths of Polynesia. Hutton (1922 a) shows from Dimapur that they fall into two different groups; the one form is a Y-shaped or forked monument, and the other is a large cylindrical stone post. On one of the oldest specimens elephants were carved in relief. These raised monoliths are not carved in human form, and Hutton (1922 b), in dealing with the theories pertaining to this, shows that there are considerations "which support the assumption that Naga monoliths are phallic in origin".[1] (See also Führer-Haimendorff 1938; 1939.)

We have seen that various shapes of terraced or pyramidal sanctuaries have a much wider distribution throughout Polynesia than the stone human statues and cut-stone *maraes*, which were all limited to its eastern side. The concept of superimposing rough stones in cairns, mounds, and platforms as a sanctuary is also too natural and universal to imply far-reaching prehistoric intercourse and diffusion unless supported by geographical reasons and architectural evidence of a more extraordinary character. Since such platforms or terraces exist both east and west of the Pacific Ocean, we shall see, however, if there is any reason to suppose that the Polynesian specimens came up wind alone rather than down wind with the stone human statuary and cut-stone masonry.

Heine-Geldern (1928; 1950 b), perhaps the most vigorous defender of the theory that the East Polynesian megaliths originated in Assam and Indonesia, claims support for this assumption by referring (1950 b, p. 188) to a paper by Hutton on "The Use of Stone in the Naga Hills", where the author "had commented on the close parallelism between certain megalithic structures of the Nagas of Assam and those of eastern Polynesia." It may therefore be reasonable to quote Hutton (1926, p. 73) fully on this point. He says: "What I have called the ceremonial use of stone is almost confined, I think, to the Angami and Kaccha Naga tribes, and is to be associated principally with the erection of stone platforms as sitting-places merely, as dancing-places, as forts or as memorials simply, for these stone platforms generally are intimately associated with the cult of the dead." Hutton also says (p. 74): "Mr Henry Balfour, when visiting Zhotsoma with me, was struck by the likeness of some of the *dahu* there to one type of '*ahu*' in Easter Island, and the description given by Mr. and Mrs. Routledge in vol. li of the *Journal of the Royal Anthropological Institute* (December, 1921) of the '*marae*' of the Society and Austral Islands struck me as most suggestive of the Angami *tehuba*, while in the Marquesas there seem to be paved dancing theatres not dissimilar in construction, actually called '*tahua*', in which, I may add, a game is played on stilts just as the Angami Nagas play it.[2] This syllable *hu* seems to be associated with stone buildings, both in the Naga Hills and in Polynesia, and one wonders whether it can have a similar significance in the place-names of South America in which it so frequently occurs, where there are also megalithic remains. For instance, Tiahuanaco, and Sacsahuaman where there is a fortress built of large stones on what appears to be, from the illustration in the Hakluyt Society's edition of *Memorias Antiquas del Peru* (p. 23), the plan of a typical *dahu*."

Before we go further let us point out a determining geographical fact: the isolated and primitive tribes of inner Assam and Easter Island are on completely antipodal points of the globe and separated by 155 degrees of longitude. Let us next observe that the Assam *dahus* as illustrated by Hutton (*Ibid.*, pl. IV) are built simply of small cubic stones, utterly different from the colossal unsymmetrical and carefully jointed megalithic blocks typical of Easter Island and early Peru. No stone human statues or similar sculptures are associated with these antipodal Assam buildings. The illustrations rendered by Hutton show also that the *dahu* has walls sloping at a plain angle to the ground, as on the Egyptian pyramids, rather than almost vertical like the masonry on the Easter Island *ahu* and on the other elevated stone platforms and terraced pyramids of Polynesia and early Peru. The angularly raised corners on the upper wall of the *dahu* also suggest an Old World fortress,[1] and we are left with the impression that, apart from the attractive similarity of the names, these antipodal structures share nothing but the idea of erecting compact stone mortuary buildings with rectangular base and flat top. This is insufficient evidence to argue a diffusion from one end of the world to the other, between two aboriginal tribes whose cultures are otherwise entirely different.

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[1] It is interesting to note with Hutton (1921 a, pp. 232, 362) that some of the Naga tribes made heavy sledges and dragged their stones over the ground. Some tribes also transported their megaliths by building them into a huge frame of scaffolding which was carried by men five or six abreast and twelve to twenty deep.

[2] For further remarks on stilt-dancing see Part IX.

Nor does the mortuary *tehuba* of the same Naga Hills seem sufficiently ingenious to argue antipodal contact. Hutton's illustration of a *tehuba* (*Ibid.*, pl. III) shows a considerable number of rough stones piled into a simple terrace, with no effort at dressing and jointing them, and with only one big slab that could not be carried by a single individual. He describes the *tehuba* (*Ibid.*) as "a raised level space for dancing sometimes surrounded by separate squared stones on which men can sit with horns of liquor and discuss public affairs, ... In the wall there are little recesses a foot deep or so in which the sitters can put their cups of liquor."

It is difficult to conceive why we are to go to the end of the earth to find the source of diffusion of a terrace so common throughout Peru, and there even in a form infinitely more akin to that of Polynesia. Hutton's comparison between the *dahu* of the Naga Hills and the terraces of Easter Island was not presented in support of a round the world journey by a Naga tribe. Hutton himself, as we have seen, was the first to add that pre-Inca constructions of Tiahuanaco and Sacsahuaman are *also* built in "the plan of a typical *dahu*".

In his attempt to bring the *dahu*, or fortified small-stone grave, of the Angami Naga Hill tribes eastwards round the world to Polynesia, Heine-Geldern (1928, p. 300) suggests a geographical link in the rectangular graves with sloping sides of un-cut stones in Fiji, and some roughly analogous stone constructions in Nias in the Indian Ocean.

The same year Dixon (1928, p. 250) launched a vigorous attack on the diffusionists who thought that the old brick-built structures of Cambodia in Indo-China might have been the prototype of structures that crossed the Pacific to inspire the Central American pyramids. He shows the loose foundation of such speculations by pointing out that the Middle American pyramids date back to the second and third century A. D., whereas "the oldest of the structures in Cambodia were not built until some five or six hundred years later." Nevertheless Ekholm (1950, p. 344) returned to the subject quite recently by reproducing a highly specialized roofed temple-pyramid from Cambodia together with what appeared to be almost a replica, but built by the Maya on the opposite side of the Pacific. Both these temples were of specialized and extraordinary architecture and yet remarkable

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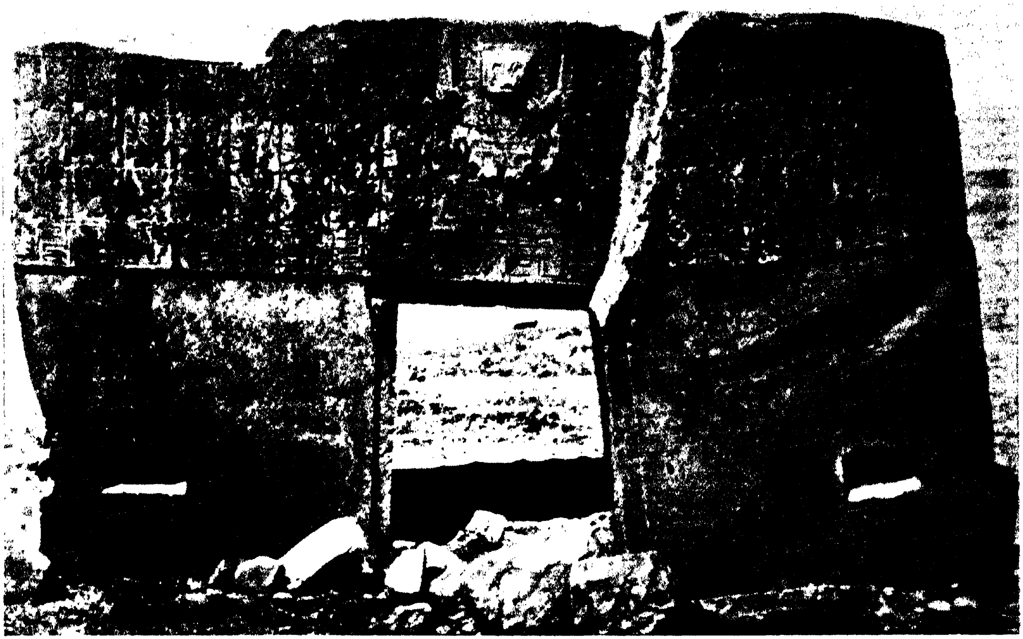
[1] Hutton (*Ibid.*, p. 74) explains that the *dahu* is a construction "which the clan can use as a coign of vantage in a fight with another clan; the Angami weapon of offence is a long throwing-spear, and it can hardly be used effectively against an enemy standing up above, while the latter can use it most effectively upon an enemy down below."



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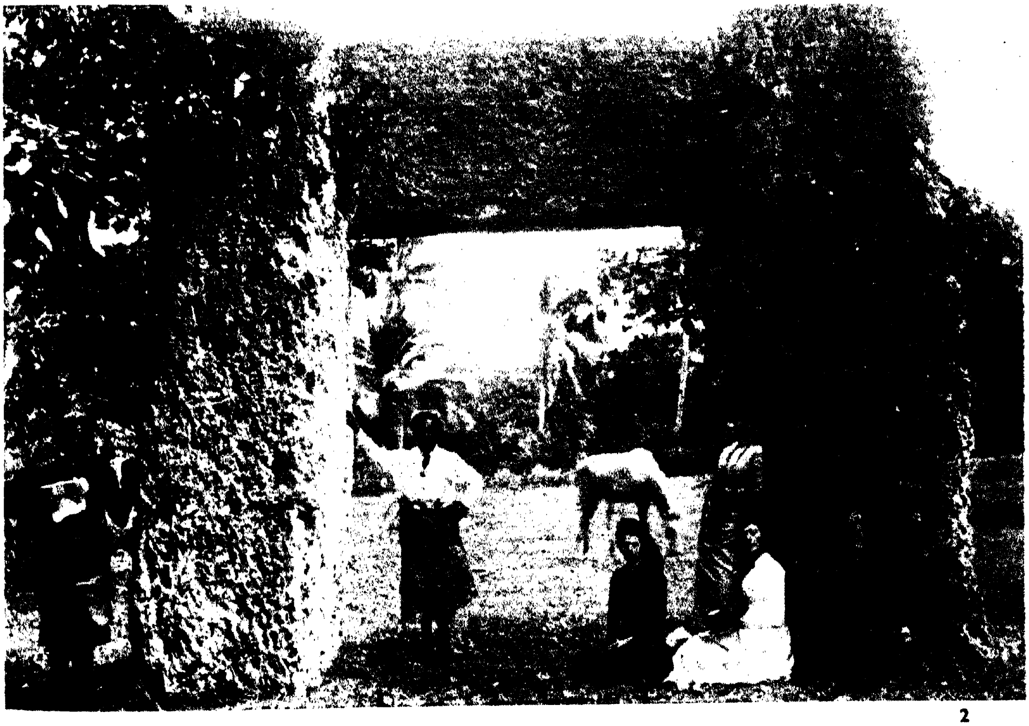
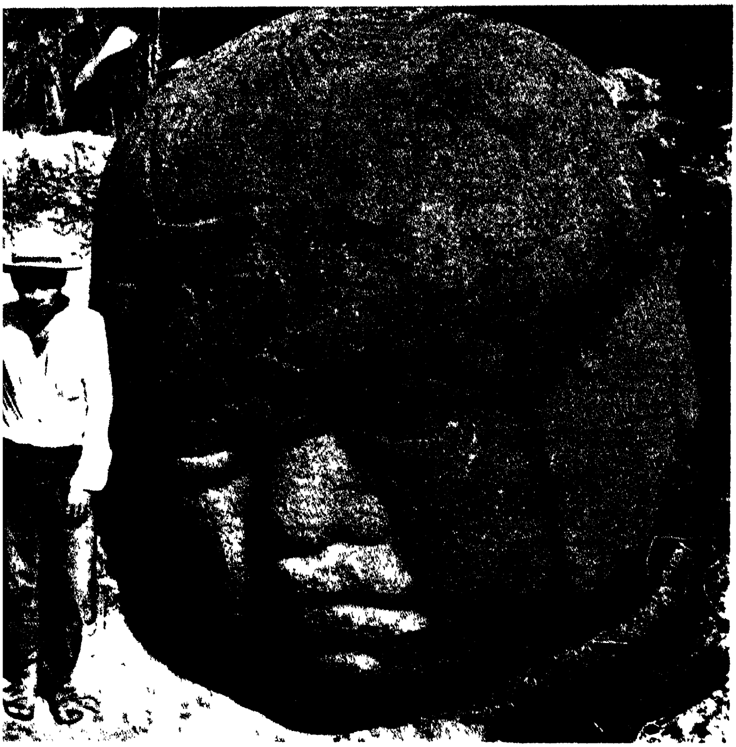
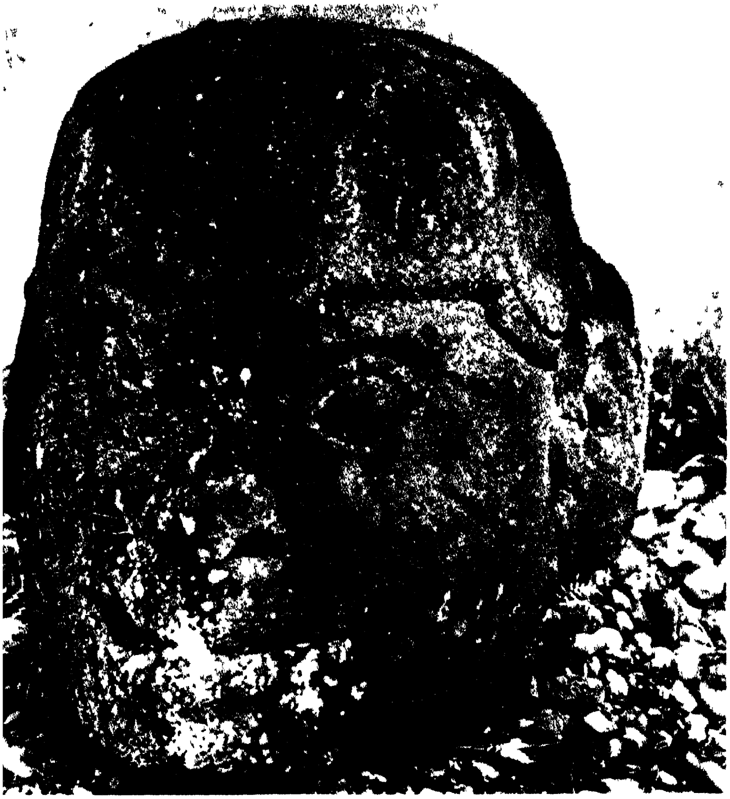


2

Cyclopean gateways. **1** The "Gateway of the Sun" at Tiahuanaco. (From *Schmidt 1929*.) **2** The east-west oriented gateway at Tongatabu, Polynesia. (Courtesy: *B. P. Bishop Museum*.) Both are prehistoric monuments of unknown purpose, forming part of no building. They were both possibly associated with solar rituals, since **1** bears a relief of the sun-god and **2** is built to face east-west.



Cyclopean Toltec stone head discovered in the jungle of Southern Mexico. (Photo: *N. G. S.* From *National Geographic Society-Smithsonean Inst. Arch. Exp. to Mexico, 1939-40.*)



Cyclopean stone head of unidentified origin at megalith-site of Pagerlam, South Sumatra. (From *Hoop 1932.*) We should not forget that while Peruvian drift voyages go to Polynesia, those from Southern Mexico would go to the Carolines and Indonesia.

similar, although very unlike any of the plain and truncated terrace-pyramids of Peru and Polynesia. But for the geographical facts and chronological evidence one might for a moment have doubted the justification for Dixon's attitude. Yet Ekholm is personally the first to admit that both these buildings are dateable, and he draws no conclusions, since the Cambodian temple was constructed as recently as the tenth century A. D., while the Maya temple was built about four centuries earlier. This fact, combined with the practical geographical consideration that about 165 degrees of the world's circumference separate the two constructions, with no intermediate architectonic link nor any intermediate land, make it necessary to deduce that we are confronted with independent evolution, or with inspiration brought by weather-driven craft down with the winds and currents from east to west.

The case of the Java pyramids

But the arguments of the pyramid diffusionists are not yet exhausted. In Java, and to some extent in Sumatra, there are stepped pyramidal structures similar to some in Polynesia, Mexico and Peru. They are, however, very near the Cambodian longitude. The few in Sumatra are very primitive in form, consisting, according to Hoop's photographs and sketches (1932, Ill. 59, 60, 62, 63), merely of a solid pile of boulders and unworked stones, with one exception (*Ibid.*, III. 48, 49) where a flat-topped pile of natural and irregular boulders are thrown together on top of a flat platform of similar boulders, in the form of a two-stepped pyramidal mound with sloping sides. Both structures are small, involve no stone-dressing or organization, and could have been carried out by single natives.

The basic resemblance of these primitive graves to some considerably more involved structures in Western and Central Java have again encouraged theories of a basic connection also with the stepped pyramids of Polynesia. (*Ibid.*, pp. 142, 164.) In these Java structures we find stepped sanctuaries which in general shape—but not in the characteristics of stone-shaping art—certainly have very much in common with the stepped platforms of early America and the far Polynesian islands. But again we ought not to forget the determining factors of chronology and of geographic logic, when called upon to decide the question of trans-Pacific diffusion versus independent evolution. Comparing the Java sanctuaries with those on the opposite side of the Pacific Ocean, we seem to find, as with some of the local statuettes and Sumatra megaliths, more analogies to the prehistoric work in early Mexico than to that of the Polynesian islands. The pyramidal sanctuary of Tjandi Soekoeh of Central Java in particular bears a striking resemblance to some of the ancient constructions of Southern Mexico. But, as Heine-Geldern (1945, p. 153) points out, this terraced Javanese sanctuary is not prehistoric; it was built in the 15th century A. D. The other analogous Javanese pyramids all date from the same recent Hindu period, after the time of Marco Polo, about the 14th and 15th centuries A. D. (*Ibid.*) This developed form can not therefore, have diffused eastwards across the Pacific, and if there is any connection with the architecture of early Mexico at all, the inspiration must have travelled down the wind from the New World only a few generations before Columbus. Heine-Geldern, however, supports (*Ibid.*) the view of Krom and Stutterheim, who have shown that these highly developed Javanese terraced sanctuaries are simply Hinduized versions of the older primitive local type of terrace and terraced mound. If this implies that we are getting back to such rough and general structures as those of South Sumatra considered above, then independent stone-gathering rather than diffusion of developed architectural style may seem to be the most tenable explanation.

There is, however, one circumstance already mentioned which seems to make it dangerous to reject altogether the possibility of a direct trans-Pacific diffusion. Although we have found chronological and geographical logic to eliminate the possibility that the inspirations can have been carried east, yet it may be difficult to find any evidence that makes a transfer in the opposite direction equally impossible, even in the 14th and 15th century A. D.

It may not be out of place to emphasize here again the enormous importance of distinguishing between voyaging distance and voyaging time in Pacific migrations. (Heyerdahl 1951.) A trans-Pacific migration bringing statues or stepped pyramids from Indonesia to Mexico would have to work its way from island group to island group against the wind; it would require centuries of intermediate island settling, population pressure and continued eastward urge, leaving stone statues and stepped pyramids behind on almost every island group during the process, if the custom was to survive until the ocean had gradually been traversed and the far continent reached. A native of early Mexico on the other hand, could get on board his raft, with or without migratory purpose, and find himself dragged along in the steady sweep of wind and current until he was cast ashore down wind in the Micronesian-Indonesian corner of the Pacific a few months later. Polynesian explorers might also, though not so readily, arrive in the same down-wind corner, though the bulk of Polynesian voyagers and castaways would be swallowed up in the buffer-territory of Papua-Melanesia, where also we have seen that all Polynesian vestiges are found exclusively on the eastern side, as in Micronesia.

If we allow ourselves to picture the unknown people behind the impressive Olmec high-culture of Southern Mexico in possession of rafts and sail such as we shall later see (Part VIII) to have survived along the Pacific coasts of northern South America, then the same Olmecs would—not in a matter of centuries, but in months and weeks—be able to carry inspiration to the alien down-wind cultures of Micronesia, Malaysia, and South China. These direct down-wind voyagers would not, like successive migrants in an opposite direction, leave large monuments on the islands, marking their route. They could even have brought architectural ideas from a neolithic culture area to lands where bronze and iron were known, in any Christian century up to the arrival of Columbus. Only when we resist the deceptive effect of inches and large island captions on a map and face the true dimensions, winds, and mobile waterways of the world's largest ocean, can we judge diffusion in the tropical Pacific on a sound basis. Oceanic diffusion must have a geographical and not a speculative approach. In the Pacific area, only Northwest America and its vicinity are natural recipients from the waters of Eastern Asia; yet Northwest America is a donor to Northern Polynesia. Southern Polynesia is a constant marine recipient from Peru. Melanesia receives what falls away from Polynesia, and so in part does Micronesia. Otherwise Micronesia, and to some extent even the Malay domain, are exposed to nature's shipments from Southern Mexico and adjoining parts of Central America.

Where Malay and Central-American parallels occur, we must still bear in mind the possibility of common inheritance from an ancestral Yellow-brown race which sent an original primitive branch the northern way along the Aleutian Islands into the New World. Only parallels beyond the scope of this original unity may fairly be attributed to vestiges of a short-cut drift *westwards* across the ocean, or regarded as independent evolution in these two areas.

This is not the place to dwell on the geographical existence of a westbound sea-road stretching from what were once early Olmec and Maya habitats down to Micronesian waters and the adjoining coasts of the Old World. It is of direct importance to the Polynesian problem, however, to note that this ever-present possibility of North Equatorial transfer would have no effect on Polynesia. The natural course of a drift by sea from prehistoric Mexico would—as in the time of the first Spanish caravels—pass westwards through the wide open latitudes separating Hawaii from the rest of Polynesia which is centred south of the Equator. There are ethnographic peculiarities which may be better understood, or at least deserve a new test by trans-Pacific diffusionists, when it is realised that neither the Marianas, the Carolines, Yap, the Palaus, nor perhaps even Malaysia, are protected by nature from drifts beginning in Central American waters; although all this westward rotating wind- and water-waste successfully isolates America from Cambodian visitors.

The megaliths of Micronesia offer no stepping-stones to Polynesia

We have already stressed that the tiny and widely flung isles and atolls of Micronesia do not form, as a map may suggest that they do, a practicable island bridge into the Central Pacific. Micronesia is in reality a wide ocean in itself, as large as that which separates North America from Europe and Africa, and the combined island area is roughly that of the Shetlands. On none of the islands in this vast territory, whether volcanic or coral atolls, have stone human statues or statuettes been left. There are no carved monuments of any type in Micronesia, with the exception of such strictly local features as the large stone money on Yap, and the rows of mushroom-shaped pillars which abound in the Marianas. None of these features find any parallels in Polynesia.

We have seen that the Micronesians, in many important features, are racially and culturally distinct from the Polynesians. Micronesia has often been considered a melting-pot of neighbouring races with some unidentified local element. A Melanesian strain has frequently been suggested, and Polynesian infiltration has certainly taken place on the easternmost groups, while the Palaus are strongly marked by their close proximity to the Malay domain. We have seen that these islands are in the straight sweep of the main current from Southern Mexico. Also, as previously mentioned, the current which reaches Hawaii from Northwest America turns west in lower latitudes and bears down upon Micronesia. It is therefore noteworthy to find that Boas (1925, p. 28) wrote: "There are also similarities that lead us to suspect contact between Micronesia and Northwest America, but all of these do not affect the main current of American cultural life."

Whatever may be the principal contributor to the main racial element in present-day Micronesia, no degree of high-culture was maintained on any of its islands when discovered by Europeans. Yet, although stone statues and carved masonry as known from Peru and Polynesia never reached the Micronesian domain, abandoned ruins from a prehistoric culture period have been found, showing that some sort of high-culture must either have passed through, or at least have flourished locally in former times. Allen (1884, p. 251) says with respect to these prehistoric ruins: "The present inhabitants are mere savages. We seem driven to accept the theory of an ancient civilization—spreading over the Pacific—whose history has yet to be unravelled."

This statement will seem extravagant to those who consider most cultures as due to local evolution, but it is difficult to understand why we should imagine that a primitive native family must have developed locally all traces we find scattered about of some bygone aboriginal civilization. In Micronesia and Polynesia alike this would imply that the founders of the local civilizations first discovered the islands while mere savages, then evolved a civilization on some tiny island under the most unfavourable conditions, and yet had time to leave their amazing achievements in ruin long before the arrival of the Europeans, and even earlier than the historic island tribes can remember. Is it not more logical to assume that the same aborigines discovered the islands at the peak of their own continental civilization, and then gradually lost their former standards in the course of their oceanic isolation, or on the subsequent arrival of the present Yellow-brown occupants?

It is important to note that none of the bronze or other metal objects typical of the stone cist graves of Indonesia have been found in Micronesia, nor any other relics indicating that any of the known civilizations of Asia had colonized or even found these isolated islands before the arrival of Europeans. Pottery was known in historic times only among the tribes in the extreme southwest corner of Micronesia—on Yap and the Palaus—but prehistoric fragments have been found in Guam, Saipan, Rota and Tinian of the Mariana Islands. (Thompson 1932, p. 24; MacLachlan 1938.) It is interesting that Beyer (1948, p. 75) points out that the *coiled* pottery occurs in Micronesia. He says in this connection: "In the Pacific region this type of pottery is found only in Melanesia— . . . Elsewhere, coiled pottery is found chiefly in northern Asia and the Americas—while it is wholly absent from Southeastern Asia and Malaysia."

We have seen also that the Marianas is the only Micronesian locality where carved upright pillars have been raised. But these are neither statues nor curb-stones of a *marae*-like enclosure; they were erected in double rows like short stone avenues. These structures are all prehistoric remains of unknown origin.[1] Each pillar generally consists of a cut coral limestone upright, capped with an upturned coral stone of hemispherical shape. Both upright and cap may vary considerably in shape and size; there are even instances of their being cut from sandstone or hard island rock. The cross-section of the upright is often rectangular, sometimes narrowing upwards, whereas the cap is generally, but not always, circular or oval in cross-section. The largest specimens in Guam rarely exceed seven feet, but on Tinian capped uprights are sixteen feet high. (Thompson 1932.) But for the peculiar shape of these capped pillars, the general idea of megalithic "stone avenues" occurs in Central America and in Indonesia. In Central America these uprights are sometimes carefully shaped.

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[1] Thompson (1932, p. 8) says: "Hidden in the jungle along the shores and in well-watered interior lowlands of Guam are double rows of upright monuments associated with caps and accompanied by burials, potsherds, and stone and shell implements. These monument sites are called *latte* or *casas de los antiguos* by the natives, who believe that they are haunted by *Taotao Mana* (people of beforetime). The natives carefully avoid these sites."

In any case the Mariana Islands are quite off the road for any migrants from Indonesia to Polynesia, especially for anyone heading for the megalith centres of the latter territory. It is hard for the modern traveller to grasp that even the Marianas are geographically located far enough up against the wind from the apparently "nearby" coast of Asia to be, nautically speaking, best approached by prehistoric craft from distant America. History will best illustrate this peculiar fact. It was Magellan who first discovered the Marianas in 1521 after crossing the entire Pacific from the New World side. The second and third visits came respectively from the southern and northern extremities of South America. (Loyasa in 1526; Saavedra in 1527.) From then on the Mariana Islands became regular stopping places for the Spanish galleons en route from Mexico to the Philippines, and they were even governed by the Viceroy of the City of Mexico. (Thompson 1932.) The North Equatorial Current and the trade wind that sent the Spaniards across from Mexico presented a serious obstacle to their return voyage, and only their knowledge of the fact that Mexico existed in the direction whence they had come encouraged them to make a long return voyage in a large semi-circle north of Hawaii. We note with Thompson (*Ibid.*, p. 52) that even in the Marianas the Spaniards found the inhabitants without swords, or even bow and arrow, whereas, as Gobien said: "They throw stones from their slings with so much force that they are often found sticking fast in the trunks of trees." They also had primitive spears with a pointed head of human bone. This war equipment in the 16th century would not indicate close relations with the high-cultures of the Old World.

All the other Micronesian islands and atolls were discovered after the Marianas,—for example the Palaus, apparently so close to the Philippines, in 1543 (by Villalobos), and many islands even in much later times; all as a consequence of the European discovery of the Americas, with their natural eastern entrance to the open Pacific.

Christian (in Enoch 1912, p. 282) describes lonely Yap, between the Marianas and the Palaus, as being "full of relics of a vanished civilization—embankments and terraces, sites of ancient cultivation, and solid roads neatly paved with regular stone blocks, ancient stone platforms and graves, and enormous council lodges of quaint design." Yap is also well known for the colossal perforated limestone discs exhibited in front of the houses and used by the present inhabitants as currency. The actual origin of these large stone wheels, from six to twelve feet in diameter, is not known, beyond the fact that they were quarried and shaped on Babelthuap Island in the Palaus, whence the larger ones were brought to Yap on rafts. (Furness 1910, p. 93.) Although there is possibly no connection, colossal perforated stone discs of somewhat similar nature have been reported from various parts of tropical America; one specimen found archæologically on the Ecuadorian coast is in the Municipal Museum of Guayaquil, and two or three are described by Verrill (1929, p. 271) and Bennett (1934, p. 444) from the ruins of Tiahuanaco.[1]

[1] Verrill says: "Perhaps the most puzzling objects among these ruins are two immense stone discs or wheels which I discovered on my last visit to Tiahuanaco. One of these is completely buried under the fallen masses of stone and only its edge is visible, while the other was concealed under small fragments and is now completely exposed. It is about seven feet in diameter, about sixteen inches in thickness, and has a square hole in its centre. It is made of the same stone as the ruins themselves and its surfaces show the same type of tool marks and the same character of workmanship." Bennett describes also from Tiahuanaco what he refers to as a "Ceremonial Grindstone" 63 cm in diameter, 16 cm thick and with an ornamental wavy band carved in relief against the outer edge.

The Carolines is a group of tiny atolls and islets spread over a distance of 1 500 miles, with its *eastern* extremity represented by lonely Kusaie. From the *east* coast of Kusaie Hernsheim (1883) writes: "Here we also find ruins of huge stone structures, which by themselves still certify that Kusaie was previously inhabited by a stronger and more intelligent human race, and that it also must have been more densely populated. Right behind the village (Lele) these colossal walls commence, and they cover almost the entire island. We found some walls upwards of 30 feet high and 15-18 feet thick. The lower part consisted of rounded basalt-blocks, many of which according to our estimation must have weighed 4-5 thousand pounds. The intermediate space was filled with small stones without cement, and higher up the construction was carried on with hexagonal columns, a form in which the basalt frequently occurs. Moss and splendid foliage covers the dark walls which run in all directions. They generally enclosed irregular squares, into which we climbed through great openings half filled with boulders... the ground was often paved with flat slabs of stone..."

Hernsheim also points out that these large stones "must have been obtained in the most distant part of Ualan, in as much as these basaltic blocks and columns only exist there. Whether rafts were constructed to fetch those giant blocks, or, whether roads led straight across the island through the jungle, remains an open question, as the frail canoes cannot come into question here. ... Narrow trenches run along the outside of the walls and lead into wide canals which at high tide are navigable by canoes and connect with the harbour."

A prehistoric culture has also left megalithic ruins at Nan Matol on the southeast coast of Ponape, another volcanic isle in the east end of the Carolines. Both cultural evidence and tradition, as Christian (1899, p. 83) emphasizes, indicate that these abandoned constructions, too, "were erected by a race preceding the present inhabitants of Ponape". The writer declares that dark-skinned Melanesian-like individuals are still seen on the island, whom the other natives point out as descendants of a former small black race that did the work of the ruined constructions. Legend also holds that there were some mythical twin brethren, Olo-sipa and Olo-sopa, who were responsible for the building of Nan Matol.

J. M. Brown (1927, p. 98) found little encouragement for any theory of submergence in this western part of the ocean. "To see Nan Matol on Ponape," he wrote, "with its canal streets is more impressive than to see the great stone structures of the Andes. ... The holy city has not sunk but been built on artificial islands with water streets. Its founder was not a coastal sailor but an oceanic conqueror. He brought kava and that could not have come from the west, but from Polynesia." Further (1915, p. 155): "Here is a Venice that with its public buildings made of immense basaltic crystals brought from twenty miles distance is said to cover eleven square miles. I spent several hours canoeing along the water-streets and yet left many island blocks with their buildings unvisited. The right-angled islets have been artificially formed on the flat surface of the reef. A great breastwork from five to six feet high has been built of huge basalt beams, some of them four or five feet in diameter. The space enclosed has then been filled up with coral debris. On each of them has been erected an edifice with walls from six to fifteen feet thick of the same columnar basalt. The largest that remains, Nan Tauach, I examined with some care. Part of its walls is still thirty feet high. But the hundreds of great stones that cover the floor and are strewn around seem to indicate that they were once at least another ten feet higher. The entrance is spacious and stepped; and in front of it stand basalt columns on end whereon the priests are said to have made the kava to offer to the gods and the chiefs. A bench about ten feet high and broad runs around the inside of this great wall and a less broad platform runs around the outside of the inner courtyard. The inner and outer walls are about thirty feet apart. And in the centre of this eighty-five by seventy-five feet court is a megalithic altar which has evidently had the vault below used as a burial place, probably of the kings. ... The founders of the city and the empire that it must have ruled were manifestedly sailors who came from the southeast. For Metalanim has inside its long breakwater water-squares and water-streets for the manoeuvring of great fleets of war-canoes, and it is on the southeast of Ponape and has its only available deepwater entrance on the east."

The same writer points out that some German anthropologists claim to have found "the American Indian physiognomy in the east of the Carolines," and Barreiro (1920) affirms that he found affinities between the speech material of the Caroline islanders and certain Mexican tongues.

Partly quoting Christian's description of the ruins of Nan Matol, Enock (1912, pp. 285, 288) wrote: "An ancient native fortress is described, terraces and a pyramid with a great lodge on its summit platform 'very much like one of the Mexican teocalli or truncated pyramids.' On the textile fabrics depicted of these people appear patterns which seem to bear some similarity to some of Mexico and Peru..." Also: "Among the articles found by digging were circular rose-pink beads, minute and delicate in design, formed of shells rubbed down and 'answering exactly to the wampum or shell bead money of the North American Indians. Beads exactly similar in design have recently been discovered in the ruins of Mitla, in Central America.' "[1]

Such beads are not found in Polynesia. It is also remarkable that it is the Central American form of shell bead rather than the Indonesian type which is excavated in the Carolines. Beads were as significant in Indonesia as in Central America, but we meet them here in an essentially different form. The Indonesian beads are made from glass in many colours, from a yellow-brown hard-baked clay, or from a pale red agate; glass and clay beads were found by Hoop, together with metal, in the stone cist graves associated with the South Sumatra megaliths. (Hoop 1932, p. 133, pl. 171, etc.)

Hoop (*Ibid.*, p. 135) observes, with Beyer and Dixon, that recent archæological finds in the Philippines show prehistoric glass beads to be here directly associated with iron knives, daggers, axes and spear points in that area. He quotes Dixon on these finds: "Now both the iron and glass objects are similar to and in some cases identical with, the prehistoric glass and iron finds in the South of India. ... As finds of similar glass beads and bangles have recently been made in the Malay Peninsula, in dolmen tombs in Java, and in North

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[1] The same authors says: "A series of huge steps brings us into a spacious court-yard... In the inner terraced enclosure lies the great central vault or treasure-chamber identified with the name of an ancient monarch known as Chau-te-reul or Chau-te-leur. Chau was the ancient Ponape word denoting (a) the sun, (b) a king. The latter signification tallies with the Rotuma Sau, a king, and the Polynesian Hau and Au, a king, chief." He might have added that it also tallies with *Abau*, the ancient designation for "king" in Guatemala, Central America. (See also Part X.)

Borneo, the inference is inescapable that we have clear evidence of a trade contact between the northern Philippines and southern India, running well back into the first millennium B. C."

Dixon shows with regard to the Philippine glass beads that some of the associated iron objects "were of local manufacture, since deposits of iron slag and evidences of iron smelting have been found. It is uncertain as to the glass, but unfinished beads adhering to each other in series of half a dozen or more are found and clear evidence of the repairing of broken bangles." Showing that southern India "becomes a way station between western Asia and the Philippines" in the diffusion of glass beads, Dixon says: "That the knowledge of glass-making reached it from western Asia is extremely probable, either by way of sea trade with southern Arabia, Mesopotamia and Egypt, or possibly overland."[1]

We have previously seen (Part I) that beads found in the highest inhabited area of central Borneo have been identified even with ancient material from B. C. Damascus and Ur of the Chaldees. There is accordingly evidence to show that glass beads had leaked from the great civilizations of the west and into the semi-continental culture-area of Malaysia at a very early period, to be deposited right across the archipelago and even in graves and strata pertaining to the megalithic workers. This again goes to demonstrate that Indonesia and Micronesia are each part of its own distinct cultural drainage area. Indonesia is in its natural geographical lay-out directly exposed to trade and other influence from the Old World; oceanic Micronesia, however, like Polynesia, is out of the natural reach of these impulses. The two latter regions are both located in the midst of the natural drainage area of the New World, each at the down-wind end of a powerful oceanic drift beginning respectively north and south of the Equatorial doldrums, in Mexico and in Peru.

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[1] For ancient glass beads in the Philippines see also Beyer (1948, p. 64).

PART VII

BOTANICAL EVIDENCE OF POLYNESIAN ROUTES

BOTANICAL EVIDENCE OF POLYNESIAN ROUTES

At the time of the first European arrivals, a number of important crop plants were cultivated by the aboriginal inhabitants of nearly all the Polynesian groups. Botanical analysis and native tradition concur to show that most, if not all, of the principal domesticated plants in Polynesia have been carried to these islands by man, partly on his original migration into the ocean, and partly during subsequent centuries of inter-island trade and activity.

We have already seen (Part I) that a major part of the Polynesian crop plants are secondary acquisitions through barter in the Fiji-Samoa-Tonga triangle to the west, and accordingly make no contribution to an effort to trace Polynesian contacts or migrations from other more distant regions of the Pacific. It is therefore highly important to analyse the aboriginal culture plants in the Polynesian section of the ocean for such elements as may indicate oversea connections with other lands around the Pacific than contiguous Melanesia.

Carter (1950, p. 161) has strongly emphasized the importance of plant evidence for a study of oceanic migrations. He says: "Plants are not constructs of the mind. They are less subject than most data to appeals to the psychic unity of mankind, parallelisms, independent inventions, limitations of techniques, and so forth."

There are indeed plants that can reach isolated oceanic habitats through long distance dispersal by currents and winds, or with the aid of birds. But very few of the cultivated plants come into this category, and those which do can easily be eliminated. Botany, therefore, as much as any branch of anthropology, has a decisive say in the study of early human oversea routes, for there is a natural limit to the creative ability of a primitive migrant with regard to his inheritance of a growing plant, and the same limit is imposed upon the subsequent theorizing of the modern observer and cultural interpreter.

When we look at the various species of crop plants brought into Polynesia before the advent of Europeans, we find very little anthropological dispute over the Old World species like the breadfruit, the banana, and other such food plants which definitely reached Polynesia from neighbouring Melanesia. Not only is it useless to speculate about a direct introduction from Indonesia to Polynesia of such plants as were in any case indigenous to interjacent Papuasia and Melanesia, but as Buck (1938 a, p. 307) has clearly demonstrated, we may disregard any possibility of a roundabout transfer to Polynesia by way of Micronesia, since the plants in question did not exist in that part of the ocean.

The sweet-potato

There is, however, an other category of important crop plants which has aroused much speculation and vigorous dispute among Pacific ethnologists, because the species included cannot in this case have reached Polynesia merely by the usual marginal diffusion from Melanesia, but speak for direct relations with early America. The principal of these species is undoubtedly the sweet-potato. The sweet-potato, or batata (*Ipomoea batatas*), belongs to the *Convolvolus*, or Morning glory, family. Genetic studies of related plant species make it probable that the relationship between the sweet-potato and *Ipomoea fastigiata*—a wild species of tropical America— is closer than that of the other species in this genus. (Sauer, with Tioutine, 1950, p. 509.) The sweet-potato was unknown to Europeans (like the regular potato) until the discovery of America, but before that time was already widely distributed among the aborigines on the Polynesian islands. (Dixon 1932.) In post-Columbian times it has become an important food crop in most warm countries. (Fosberg 1945, p. 20; Cooley 1948.)

Hornell (1946 a, p. 41) writes: "Botanists are agreed that America is the area within which the sweet potato was first brought under cultivation. One consequence arising from this conclusion is that the problem of the means whereby it became diffused throughout the island world of Oceania has given rise to great controversy."

A prominent botanist like Merrill, who in a series of publications (1920; 1930; etc.) has vigorously opposed the view that there was any diffusion of culture plants between the Americas and any part of the outside world prior to the advent of Columbus, still makes a specific exception with regard to the aboriginal agriculturists of the Polynesian island world (1946, p. 344): "...but they did introduce into Polynesia one important food plant of American origin, the sweet potato, and spread it from Hawaii to New Zealand ... well before the advent of the Europeans in the Pacific Basin." He adds (*Ibid.*, p. 388; 1946 b, p. 24):

"I have found no references that lead me to believe that the sweet potato reached any part of Papuasia, Malaysia or tropic Asia before the arrival of the Europeans."[1]

Further (1950, p. 7) he says: "Its later introduction into the Philippines and the Indo-Malaysian region did not take place until later, when it was consummated by the early Portuguese and Spanish explorers or settlers. This pre-Magellan occurrence of the sweet potato in Polynesia I would accept as proof that the Polynesians in their remarkable expansion over the Pacific Islands, actually did reach the western coast of America, and that some of these early voyagers did succeed in returning to their island homes."

Sauer (1950, p. 509) suggests, for purely botanical reasons, an original domestication of the sweet-potato in South America rather than in Central America or the Antilles, and says further: "The sweetpotato belongs in a culture complex that operated by vegetal means of reproduction, that is, by cuttings of plants or tubers, and not by seed reproduction. ... Under ordinary means of reproduction (not counting scientific hybridization) the sweetpotato is multiplied entirely by plant division. ... It is possible, therefore, that all sweetpotatoes have been derived from a few ancestral plants which were multiplied by dividing and planting their shoots by generation after generation of planters."

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[1] Both Laufer (1929) and Cooley (1948) have shown that the sweet-potato was introduced to China in 1594. Liou and Yong (1931, p. 35) too, in their study of Chinese plants, show that the sweet-potato was not a local plant until it had been imported from Central America.

Showing that the Polynesian varieties developed from shoots carried in prehistoric times out of America, the author adds: "It may also be noted that these Maori forms seem to have been starchy and coarse-fibred, like the cumara of the Andean yungas, and suggest a derivation from an older, and now nearly extinguished American form."

Nearly a century ago Seemann, Markham and, subsequently, also Gray and Trumbull, pointed out that the sweet-potato was known to the aborigines of the widespread Polynesian islands by the same name as that used for the same plant by certain aborigines of Ecuador and Peru. (Carter 1950, p. 162.) Thereafter attention to the sweet-potato spread from botanists to ethnologists. The natural implications that arose gave no support to existing migration theories, and the immediate reaction among Pacific ethnologists was, not to draw benefit from this unusually classic ethno-botanical evidence, but instead to concentrate on plausible suggestions that might reduce the anthropological complications which seemed to develop.

There has been no limit to the variety of explanations why the American sweet-potato was under cultivation in Polynesia when Europeans arrived. It has even been suggested that a Peruvian sweet-potato might have been caught between the roots of a falling tree near the Pacific shore, and drifted with the tree in the Humboldt Current until washed ashore in Polynesia, where it was found and cultivated by the inhabitants. Apart from the fact that such speculations completely fail to appreciate the succulent nature and tender growth of this tuber, they do not explain how the Polynesians recognized it by its original South American name.

According to Hillebrand (1888, p. 314) it seems that Seemann was the first to record that the sweet-potato was known as *Cumar* (Kumar) in the Quechua-dialect of Ecuador, whereas it was known in Polynesia as *Kumara*, with sundry dialectical variations. Seemann (1865-73, p. 170) wrote himself that he found '*Cumar*' in the Ecuadorian highlands, an observation which he considered "perhaps pointing to the country whence the South Sea Islanders originally obtained this esculent." Other writers (Imbelloni 1926 a, p. 47; Friederici 1929, p. 478; Merrill 1946, p. 389; etc.) have later extended this comparison and shown that the root of this ancient South American-Polynesian name has a wide geographical distribution within both these adjoining East Pacific territories. In various Quechua dialects of Peru and Ecuador the sweet-potato is known under the name *Kumara*, *Ckumara*, *Cumar'*, *Umar'*, *Kumal*, and in Colombia as *Umala* and *Kuala*, the latter name extending as far north as in Cuna dialect. (Imbelloni 1926 a; 1940; Hornell 1946 a; Markham 1864; Middendorf 1890.) Cook (1925, p. 106) also mentions the Cuzco variety *cusi-cumara*, said to mean "long cumara". It is a current but erroneous belief among many Polynesianists that the sweet-potato has a limited northern distribution in Peru. This is not so. It is known from archæological finds on the coast at Paracas south of Calloa, and Bingham (1948, p. 15) shows that it was cultivated under the name *Cumara* (*Kumara*) by the Indians in the Urubamba Valley in the south central Andes. Imbelloni (1940, p. 203) shows from the same inland valley that each variety of sweet potato, according to shape and colour, has its own distinctive name, but always with the suffix *kumara*. Tello (1928, p. 260) says that sweet-potatoes "were cultivated in all the Yunka [hot] lands, trans-Andean, inter-

Andean, cis-Andean, and coastal." Its southern limit of aboriginal cultivation was beyond the borders of Peru, and down in the valleys of the central coast of Chile. (Latcham 1936.)

Going next to Polynesia, we find the name *Kumara* is used for the same sweet-potato in Easter Island, the Tuamotus, Mangareva, and New Zealand; in the Marquesas dialect *Kuma'a*; in Tahiti, *Umara*; Hawaii, *Uala*; Mangaia, *Uara*; Rarotonga, *Kuara*; Tonga and Futuna, *Kumala*; Samoa, '*Umala*. We may therefore safely conclude with Merrill (1946, p. 389) that: "Within Polynesia the name for the sweet potato seems consistently to have been derived from the Quechua *kumara*."

The sweet-potato spread with the advanced Polynesian colonists almost as far west as they went—for example to Fiji, the New Hebrides and Banks Islands, whither the tuber likewise brought its original Peru-Polynesian name, *Kumara*. (Seemann 1865-73, p. 140; etc.) Further west, the American tuber and its accompanying name never reached. Obviously, it was man and not nature alone, that had been active in the transplantation from America to Polynesia of this important food plant with its traditional native name.

After much pure speculation, no agreement had been reached on the subject when Friederici in 1929 (pp. 469-487) published a paper in which he put forward what he claimed to be a final solution. According to his theory the sweet-potato and its Quechua name could have accompanied the early Spanish caravels of Mendaña and Quirós on their initial voyages of discovery from Peru to Melanesia. The first voyages passed right through the tiny islands of Polynesia nearer Peru, without sighting land, and Friederici's theory was that, if Mendaña and Quirós had planted sweet-potatoes in Melanesia and left the native name *kumara* with the local inhabitants, this crop plant and its Peruvian name might have been spread east to Polynesia by native craft by the time the later European expeditions, a few decades afterwards, began to discover also the first Polynesian groups. The discovery of extensive Peruvian *kumara*-plantations in far-flung areas of Polynesia would then, in his view, merely be misleading to observers, as the actual Polynesian importation had then been from Melanesia, in post-European time.

Friederici's theory was soon adopted by Lehmann (1930, p. 340), and was for some years cited in the literature of the subject as a plausible way out of the dilemma caused by the cultivation of this American plant in Polynesia.

Then, in 1932, Dixon presented the first strong and well-founded counter-arguments in his paper "The Problem of the Sweet Potato in Polynesia", which again marked a turning-point in the discussion. He clearly demonstrated by historic evidence that remote and long isolated Polynesian habitats—like Hawaii, Easter Island, and New Zealand—which had had no contact with Melanesia, not even with nuclear Polynesia, during or after the decades of the Mendaña and Quirós expeditions, yet possessed large and ancient *kumara* plantations when first discovered by European voyagers. This was in no way compatible with Friederici's hypothesis.

Dixon (*Ibid.*, p. 44) thus says of the most isolated of these islands: "In Easter Island Roggeween, its discoverer in 1722, and every succeeding visitor down to and including Beechey in 1825 speak of the sweet potato as abundant, grown in large plantations, and as one of the mainstays of the native food."

These facts, and the failure to find any reference to the caretaking of sweet-potato in Mendaña's and Quirós' logs, proved the futility of crediting our own race with spreading the *kumara* from Peru to Polynesia, by way of Melanesia, in historic times. Dixon (*Ibid.*, p. 59) writes: "With a Spanish source of introduction in the sixteenth and seventeenth centuries thus eliminated, we are brought face to face with the problem of pre-Columbian contacts between South America and Polynesia, and must explain the presence of the sweet potato in the Pacific as due either to Polynesian voyagers who, reaching American shores, brought back the plant with them on their return to their homeland, or to Peruvian or other American Indians who sailed westward and carried the sweet potato with them to Polynesia thousands of miles away."

As Carter (1950, p. 162) points out, it is important that this analysis of the true value of the *kumara* evidence was first brought up for serious consideration by Dixon, as he was otherwise certainly no protagonist of trans-Pacific influences. We may note that even a devoted defender of the Indonesian migration route like Buck (1938 a, p. 313) adds, after showing that Melanesia and not Indonesia has yielded some of the West Pacific food plants to the Polynesians: "Let us now consider the sweet potato (*Ipomœa batatas*) which entered Polynesia from the east and not from Asia. Botanists have determined the original home of the sweet potato as South America. The theory of a German scientist that it was introduced into Polynesia by Spaniards is based on inaccurate data and is untenable. From traditional history we learn that the sweet potato was in Hawai'i by 1250 A. D. and in New Zealand in 1350 A. D. at the latest. As there are no traditions of later contact with the outside world, it is evident that the Polynesians themselves carried the sweet potato from central Polynesia to the northern and southern angles of the Polynesian triangle." Also Hornell (1946 a, p. 61) points to this important fact: "... had the sweet potato been introduced [by Mendaña] even so early as 1568, this would not have allowed sufficient time for its diffusion to Easter Island, New Zealand and Hawaii..., because long inter-island voyages, such as those from Hawaii to Tahiti and those from Tahiti to Easter Island, *had been discontinued after the close of the fourteenth century.*"

It is noteworthy that nowhere in Polynesia was the sweet-potato of such major importance to the primitive agriculturists as in these marginal territories of Easter Island, New Zealand, and Hawaii. This in itself is a fact that has aroused much speculation, and the true answer has possibly been given by Carter (1950, p. 163), who shows that the plant would be likely to have just such a marginal distribution if it had been brought during the initial period of voyaging during the first millennium A. D. It would then have had its diffusion "prior to the influences on central Polynesia in medieval times." He shows with Dixon that this initial period of introduction, "centuries before 1000 A. D.", is also indicated by the vagueness in Polynesian history as to when the *kumara* came into the possession of their ancestors. There is indeed no tradition indicating that it was brought to Polynesia as recently as in the period of long voyages at the beginning of the present millennium. We may add that there are a vast quantity of traditions to the contrary. This fact will shortly be dealt with.

If we first turn our attention to Hawaii, we may recall (p. 337 above) that Cook met with the sweet-potato as soon as he began to explore these northern islands. The pyramid where he was worshipped as the returning white Lono was in a field of Peruvian *kumara*, known in the soft Hawaiian dialect as *'uala*.[1] The local importance of this aboriginal crop plant is obvious, as Bryan (1935, p. 82) says of its existence in Hawaii: "About 60 varieties were known, varying in color from light yellow to deep red, as well as in size and texture."

Carter (1950, p. 163) writes: "Since the sweet potato is vegetatively reproduced, variation would expectably be quite slow. Yet Hawaii had many varieties and this, also, must mean either considerable antiquity or importation of a considerable range of varieties. In Hawaii Dixon noted that the plant is referred to in most archaic cosmogonic chants and myths and is associated with the major gods. It has elaborate rituals associated with its planting, cultivation, and storage. Evidence from traditions, botany, language, and ritual all suggests antiquity for the crop."

Locke (1921) records a long mythical account also from Hawaii, describing how the sweet-potato became such an important local food. The essentials of the early myth are that a certain ancestral hero named Pou went back to the earliest *ancestral land* to procure the *kumara*, and arriving there as a pilgrim in the home of the God of the Sun, he obtained the precious ancestral *kumara* from him.

What we have seen with Dixon was later stressed by Métraux (1940, p. 153), who has shown that the sweet-potato took the place of bread on Easter Island and was mentioned by all the early travellers as one of the most important food staples on that lonely island. From the Dutch discovery we find it described in Roggeween's log (1722, p. 21) and in Behrens' narrative (1737, p. 135). During the Spanish rediscovery from Peru we again read about it in Dalrymple's letter. (Corney 1903.) During Cook's subsequent visit also we hear of "extensive plantations of potatoes" and of "vestiges of former plantations on the hills". (Forster 1778, p. 236.) Beechey also (1831, p. 31) describes the same ancient plantations and shows how they were painstakingly taken care of. He says that such places as were not immediately exposed to the scorching rays of the sun were laid out in oblong strips, following the direction of the ravines, and furrows were dug at right angles to them to intercept the streams of rain-water in their descent. Such a procedure during the cultivation of the soil was, indeed, most familiar also to the aborigines of the arid ravines and valleys of Peru. The fact that local tradition (Thomson 1889) claims that Hotu Matua, the legendary discoverer of the island, brought the sweet-potato with him on his arrival, shows that this crop plant is not a recent introduction to Easter Island any more than to Hawaii.

Beechey (1831, p. 135) also records the sweet-potato as in cultivation among the raftsmen of Mangareva when he was the first European to visit that group; while Henry (1928, p. 38) says that the Tahitians have six principal varieties of this plant, and claim to have had their *'umara* from time immemorial.

F. B. H. Brown (1935) shows that in the Marquesas Group five old varieties of sweet-potato (*kuma'a*; *'uma'a*) were described by the elder among the natives. They were all of inferior grade, small, watery, and stringy and the author says: "... it seems clear that, although the sweet potato was one of the earliest food plants to be cultivated in the Marquesas, it was poorly adapted to the soil, climate, topography, and related conditions,

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[1] It is noteworthy that both in Hawaii and in New Zealand Lono (Rongo) represents the patron of agriculture. Best (1925 b, p. 109) quotes the following Maori saying: *Te ariki o nga Kumara ko Rongo te ingoa*;... or "The master being of *Kumara* was named Rongo".

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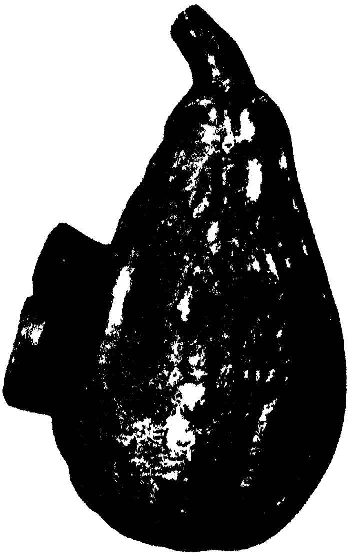

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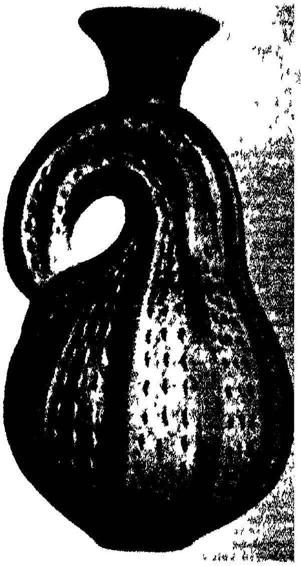

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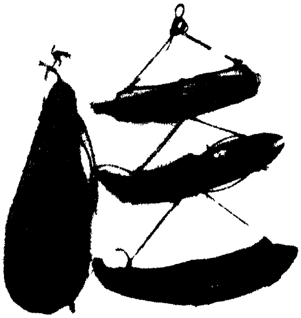

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The American sweet-potato was spread all over Polynesia with its Peruvian name *kumara*; **1** fresh tubers (from *Safford 1925*), **3** dried tubers from pre-Inca graves in Peru (photo: *Amer. Mus. Nat. Hist.*). **2** Sprouting coconuts and gourd on board the *Kon-Tiki* raft. **4, 5** Fruits sculptured by Early Chimu potters. (From *Leicht 1944.*) **6** Hawaiian *ipu-nui*. (Photo: *B. P. Bishop Mus.*) **7** Gourd water bottles for canoes. (From *Brigham 1908.*) **8** *Argemone mexicana*. (From *Wilkes 1796.*) **9** Marquesan pineapple. (From *Brown 1931.*)

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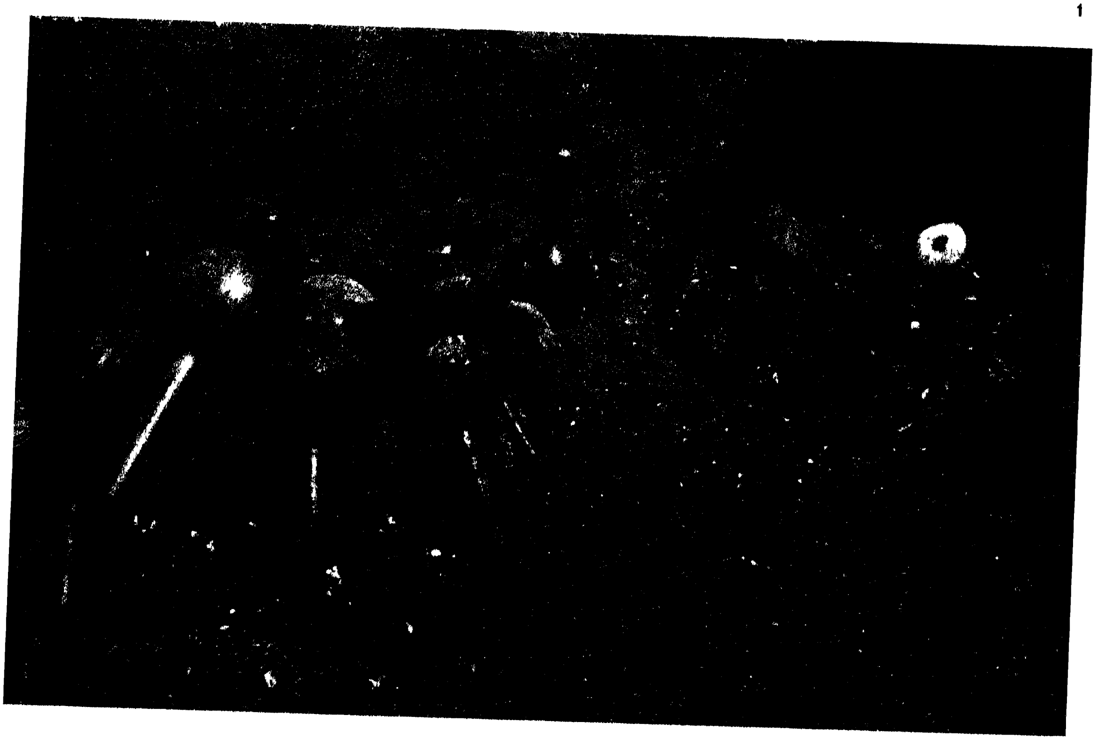

2

The bottle gourd, *Lagenaria siceraria*, can only spread across open oceans through the agency of man. It was common to prehistoric Peru and Polynesia, and used in an identical way. **1** Polynesian gourds from Hawaii. (Photo: *B. P. Bishop Mus.*) **2** An archæological fishnet with gourd floats, from the pre-ceramic period of Pacific North Peru, deposited a millennium or more before the commencement of Polynesian sailings. (Photo: *J. Bird.*) Note remains of string attachment on gourd to lower right.

and was therefore gradually replaced by the breadfruit until, at the time of discovery by Europeans, the sweet potato had become a very subordinate plant in the native agriculture, being used principally in times of famine."[1]

Travers (1876, p. 19) quotes a Chatham Island legend that some very early immigrants to their islands had "left because the climate was unfit for the growth of the *kumara.*" The fact that the Morioris had preserved the traditional name of this plant that would not grow on their islands has in itself aroused comment.

In his comprehensive studies of *Maori Agriculture,* Best (1925 b; 1930) shows how Cook on his first voyage discovered "very large plantations of sweetpotatoes" in widespread areas of New Zealand. Best observes (1930, p. 358): "The *kumara* or sweet potato was the most important of the cultivated food-products of the Maori folk of these isles. It was because of this fact that most of the ceremonial pertaining to agriculture was connected with this highly-prized tuber. In like manner, and probably for the same reason, a number of myths and quaint beliefs pertained to it."

When we come to consider the old Polynesian traditions, we find ample evidence to show that the sweet-potato as a crop plant has a special position in the islands' pre-history, and that it was certainly not introduced by Europeans. Walsh (1903, p. 12) says in his paper "On the Cultivation and Treatment of the Kumara": "With the primitive Maoris, in fact, the *kumara* stood in a class by itself, above and apart from everything else. As the mainstay of life it was regarded with the greatest respect and veneration. It was celebrated in song, and story, and proverb. Its cultivation and treatment called forth the utmost care and ingenuity, and were accompanied by the strictest and most elaborate religious observances."

It is thus apparent that not only to the modern botanist and ethnologist, but also to the primitive Polynesian agriculturist, the *kumara* stood in a class by itself among the local culture plants. From the time Colenso (1881) published his paper "On the Vegetable Food of the Ancient New Zealanders before Cook's Visit", the sacred nature and great antiquity of the *kumara* in Maori culture has repeatedly been pointed out and stressed by local investigators. Colenso showed remarkable varieties in the size, shape, colour and flavour of the Maori sweet-potato, and states that not less than thirty such varieties had come to his notice, while several of the old sorts were already known to be lost.

The fact that the sweet-potato decreased rather than increased in importance at the arrival of the Europeans is demonstrated by Walsh (1903, p. 13) and by Best (1925 b, pp. 55, 58). The former says: "As the European food plants—especially the potato—came into use, the relative importance of the kumara somewhat declined, and many of the smaller varieties became gradually extinct..."

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[1] Compare Ellis (1829, Vol. I, p. 46) who wrote that although the sweet potato in the Hawaiian Group was "one of the principal means of subsistence", yet in Tahiti "it is only partially cultivated, and is greatly inferior to those grown in the northern islands, probably from the difference of soil and climate." This may well indicate that soil, and climate too, may be an important factor in determining the relative importance of the sweet potato in various parts of Polynesia. Malo (1898, p. 42) writes: "The sweet potato (*uala*), the Maori *kumara*, was an important article of food in Hawaii... The *uala* grows abundantly on the *kula* lands, or dry plains." Hornell also (1946 a, p. 58) shows that in Polynesia: "Unlike the breadfruit which flourishes in moist heat, the sweet potato is suitable for cultivation on dry upland plains and slopes." Such soil conditions are best represented in Hawaii, Easter Island, and New Zealand, while less common in the tropical islands of nuclear Polynesia, and this is probably the best explanation for the specifically marginal importance of the sweet-potato in Polynesian agriculture.

Carter (1950, p. 163) adds a further consideration evincing independent of other consideration that the *kumara* was cultivated among the Maoris in pre-European times: "There is also physical evidence. At the time of discovery New Zealand had extensive areas of land in sweet potatoes. Pits from which gravel was dug for hilling the potatoes covered many acres and some had been excavated to depths of five or six feet. In some of these pits trees of great age were growing. Excavation of an acre of ground to a depth of five feet involves the removal of approximately twenty million pounds of gravel. The loads may have been basket loads of perhaps five pounds each. That suggests four million loads of gravel carried for each acre of ground so excavated. When it is remembered that there were many acres, and that the work would have been done intermittently, then an impression of a considerable elapse of time is gained."

Sauer (1950, p. 510) has also recently presented botanical proof of the pre-European introduction of the sweet-potato to New Zealand in the fact that the Maoris had gradually succeeded in developing an extraordinary variety of forms, including races that willingly grew even farther south than the Canterbury Plain on the South Island, much farther removed from its tropical growth conditions anywhere in the New World, actually representing the highest latitude reached by aboriginal agriculture anywhere in the Southern Hemisphere. "Such an adaption to high latitude and very cool summers is nearly incredible for a selection to have been made as the result of casual, late introduction by European sailing vessels."

When we now come to consider the Maori traditions which deal so explicitly with the origin of the *kumara*, we find the native versions to fall into three categories; a) the traditional memories which are of a narrative historical nature and describe in a practical way how the tribal ancestors brought the sweet-potato down to New Zealand, b) the legendary versions which often have a poetic parabolic origin and explain how the *kumara* was first brought from the earliest land of their forefathers and out to the Pacific islands, and c) the mythical beliefs which are of a purely religious nature and describe how the sweet-potato as such first came into existence.

More than a hundred years ago Polack (1838, Vol. I, p. 359) noticed that the natives in the Bay of Plenty on the northeast coast of New Zealand claimed that at a very remote period, when their sacred ancestors first arrived from oversea, "the only article of food they brought with them was the kumara, which is yet regarded as food of divine origin." Similar traditions occur in most parts of New Zealand. They are so common and so widespread that Best (1925 b, p. 54) suggests that: "It is highly probable that seed tubers were brought hither by a number of different vessels, and that each tribe has endeavoured to claim distinction for its own ancestors and ancestral vessels. No such controversy exists concerning the introduction of the *taro* and gourd, possibly because they were not such important food providers as the sweet potato."

Best also shows with Maori tradition that, on account of the tenderness of the *kumara* tuber and its liability to injury by strong or cold winds, the first precious seed-tubers were brought to New Zealand by early immigrants in a bag or a belt close to the body. Women were occasionally said to have had this duty. (See also Buck 1938 a, p. 275.)

In view of the already discussed fundamental complexity of the Maori stock, it is important to note Tregear's statement (1904, p. 145) that, according to tradition, the *kumara* was "the ancestral food" of only "one branch" of the Maori people.

It may be a coincidence, but it is at least an interesting one, that in one Maori tradition the sweet-potato is associated with a type of sea-going craft different from the dugout canoe of the modern Maori (and that of the Northwest American coast). Gudgeon (1909) in his "Maori Traditions as to the Kumara" and Best (1925 a) in his *Maori Canoe* both relate how Toi's people had arrived in New Zealand and pulled their great canoes up on the beach, when some foreign god-men appeared in craft "unlike canoes", composed merely of wood lashed together. These god-men had the *kumara* and gave Toi some to eat, but when they saw Toi's elaborate canoes with raised bow and stern-pieces on the beach, they asked in surprise what they were. Since these god-like strangers, who possibly travelled on wooden rafts, visited the newcomers soon after these had established their first settlement on New Zealand soil, they were apparently representatives of some of the aboriginal people (*patu-pai-arehe* or *pakehakeha*) which was later gradually absorbed by the Maoris. This alone will explain the Maori claim that the sweet-potato was the ancestral food of "one branch" of their composite race.

White (1889, p. 108) recorded a Maori tradition which shows clearly that the Maori well knew the direction whence the sacred *kumara* had come. Describing a visit to New Zealand by a voyager from the sacred ancestral Hawaiki, the tradition goes: "On the following day, as the sun rose, he called to the people and said 'come outside'. They went to see what he wished them to look at, and asked, 'What are we to see?' He answered, 'Let your eyes feed on the sight. Look at that part of the heavens where the red sun comes up—to the place where Kawakawa-nui and Pipiko-nui are,' They asked 'Is the *kumara* from thence?' He said, 'Yes' . . ."[1]

White (*Ibid.*, Vol. III, p. 117) also shows that where the sweet-potato first grew was, according to the tribal traditions, the original Fatherland. Thence the *kumara* had been brought from two cliffs called *Pari-nui-te-ra*, or "great cliff of the sun," and *Pari-nui-te-rangi*, or "great cliff of the heaven".

Percy Smith (1910 a, pp. 49, 139) also found definite traditions to the effect that the sacred *kumara* grew wild in certain open places of the original Fatherland. He also refers to a very ancient traditional song in which it is stated that the original home of the god-like Maori ancestry "is the land where the kumara grows spontaneously." Puzzled to find such a statement in a sacred Maori chant, Smith adds: "Central America is the part where it grows spontaneously, and therefore must be its native habitat." He admits that the old Maori song possibly refers to tropic America, but hastens to add: "If we could, however, find a country—say in Indonesia or that neighbourhood—where the kumara grows wild, it would with more probability be the Hawaiki referred to in the chant."

We know, however, that the *kumara* was introduced to the Orient by way of the Philippines and Indonesia in historic times, and by Spanish expeditions from Mexico. (Merrill 1950, p. 7.) Neither did it grow spontaneously in Indonesia in prehistoric times nor did it, when introduced by Europeans, acquire the name *kumara*, for the Spaniards brought it to the Philippines with its Nahuatl name *camote*. (Merrill 1946, p. 389; 1946 b, p. 25.)

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[1] Kawakawa-nui and Pipiko-nui are well known Maori names referring to places in their most ancient ancestral abode. (See further Part X.)

When we go back to legendary times in Polynesia we find the sweet-potato as well as the gourd constantly referred to as staple diets and important possessions of the earliest divine voyagers from the continental Fatherland. We shall later return to the case of the gourd. Best's work is full of references to *kumara* traditions associated with the life of gods, deities, and renowned pan-Polynesian culture-heroes referable to the pre-island era of the earliest ancestral stock. (Best 1925 b, pp. 47-119.) Remembering the Peruvian culture-hero *Ticci* or *Tici*, who left his lofty Andean abode for the coast of North Peru and Ecuador and subsequently set out into the Pacific, we may note with White (1889, Vol. I, p. 142) and Best (1925 b, p. 50) that according to Maori memories or beliefs "Tiki was the progenitor of Huruka, who took Pani to wife, and she produced the *kumara*..." Another version is that Pani, the sister of Maui [Maui-tiki-tiki] who discovered the islands, was the 'mother' of the sweet-potato. (Best 1930, p. 360.) Furthermore, Percy Smith (1910 a, p. 50) writes: "Another story is to the effect that Pani and her husband Tiki visited an island where the people had no Kumara, and finding that food was scarce, he sent back his wife to another country to fetch some Kumara."

Since Tiki is a deified ancestor remembered as a principal progenitor throughout most Polynesian islands, it is highly significant to note how closely the *kumara* is associated with his arrival, his family, and his homeland.

We found that in 1932 Dixon managed to prove that the sweet-potato had either been fetched from prehistoric South America by visitors from the Polynesian islands, or had simply been brought out to the island by aboriginal American craft. In the same year an authority on aboriginal navigation off the west coast of South America (Lothrop 1932) published the assertion that aboriginal South Americans could *not* have reached Polynesia because their balsa rafts were not buoyant and seaworthy enough for more than close coastal voyaging. In a subsequent publication, therefore, Dixon (1934, p. 173) wrote: "The plant could only have reached Polynesia from America by the aid of human hands, and since we have no evidence that at any time the Indians of the Pacific coast of South America, where the sweet potato was grown, had either the craft or the skill for making long sea journeys, we are forced to conclude that the transference of the plant was carried out by Polynesians."[1]

This view was later adopted by Buck (1938 a, p. 314), who also based his reasoning on the assumption that South American craft could not have been capable of carrying the *kumara* straight from its homeland to Polynesia. Buck maintains that Polynesian voyagers sailed east to Peru and subsequently returned to the islands with the *kumara*, but he goes on to show that this voyage could not have started from Easter Island, though this island is so near Peru, because the Easter Islanders had not the timber to make a canoe that could reach America. He further finds it improbable that Easter Island even served as a port of call for the prehistoric Polynesian voyager who went to fetch the sweet-potato, "because any voyager who had come over a thousand miles from the nearest land in eastern Polynesia would have settled there and not gone on. ... But, even if a canoe had gone on from Easter Island, the probability is that it would have touched the American coast south of Peru where the sweet potato name of *kumar* was unknown."

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[1] Further (*Ibid.*): "That the region where the sweet potato was thus secured must have been Peru, is made probable by the fact that the basic Polynesian term for the plant, 'kumara', is that used by the Kechua-speaking people of Peru. The word does not occur in the southern or Incan dialect, but in the supposedly older Chinchasuyo dialect, spoken along the coast for a hundred miles or more north and south of Lima."

Other considerations make Buck reject Mangareva and the Tuamotu atolls also as starting points for this theoretical expedition to Peru, and he finally comes to the conclusion that the voyagers must have steered east from the Marquesas Islands: "The clear open sea between the Marquesas and north Peru offered no interruption, and hence we will assume that the expedition set out from the Marquesas. The distance from the Marquesas to the north Peruvian coast is just over 4 000 miles. ... Had the leader of the expedition suspected that the distance to the nearest land toward the east was so great, he probably would have waited until the westerly winds were over and then sailed in a different direction."

After experiencing all seasons in the Marquesas Islands, and a drift voyage across the sea under discussion, I find it very difficult to understand this comfort in the "westerly winds", so frequently met with in the theoretical treatment of primitive voyaging in this part of the Pacific, which represents the heart of the trade wind belt. Furthermore, Buck bases his identification of the prehistoric *kumara* cultivation in Polynesia directly on Maori-Polynesian traditions, but he fails to mention that the same traditions refer the origin of this specific plant to their own former Fatherland.

In 1945 and 1946 Hornell attacked the problem from a practical angle in his two papers "Was there a pre-Columbian contact between the peoples of Oceania and S. America?" and "How did the Sweet Potato reach Oceania?" As an authority on aboriginal craft and navigation he focuses his attention on the existing currents, winds, and prevailing drifts in the oceanic basin between South America and Eastern Polynesia, and he gives a warning: "Regarding the supposed lack of maritime initiative and skill of Peruvian sailors in pre-Columbian times, we should assume a cautious attitude."

Presenting an array of practical evidence against the assumption that Pacific islanders went east to transfer the Peruvian plant, with its Quechua name, from the mainland to their own island base 4 000 miles back to the west, Hornell (1945, p. 189) concludes that the transfer in all probability resulted from "an involuntary drift voyage *from* Peru, consequent upon the dismasting and crippling of a *balsa* raft when on a coast-wise voyage." But even Hornell makes the reservation that such a drift voyage would not be feasible unless the Peruvians knew a method by which they could waterproof the absorbent balsa logs, and he does not associate the problem of the transference of the *Ipomoea batatas* with that of the complex origin of the Polynesian islanders.

Hornell's view that the aboriginal Peruvians, with all the benefit of the Humboldt Current, had brought their own crop plant on a direct down-wind journey to the Marquesas or the Tuamotu Islands failed to meet with much encouragement among anthropologists. The opinion was universal among Americanists as well as among Pacific ethnologists that the South American balsa raft was unsuitable for deep sea voyaging, and *a priori* Buck's theory of a forgotten two-way expedition starting from the Marquesas was considered most plausible.

A few years earlier the present author (1941 b) had suggested the possibility of a general cultural transfer from pre-Inca Peru to uninhabited Polynesia, claiming that the South American *kumara* as well as the gourd might have spread with balsa rafts carrying the earliest Polynesian settlers out of Pacific South America. This suggestion was even more drastic than Hornell's, and therefore met a similar fate. But in 1947 the Kon-Tiki expedition proved its feasibility: crop plants could have spread with weather-driven balsa rafts from the *kumara* fields of coastal Peru to Polynesia. Thereby the old argument that the sweet-potato, etc. could not have been spread westward by its prehistoric Peruvian planters was undermined, and the problem was open for revision.

This sudden change in a fundamental detail of the discussion unfortunately created an atmosphere of tension among some of the extreme evolutionists, and Karsten (1949), in an attempt to reduce the apparent implications of the balsa raft voyage, hastily sponsored a new theory on the history of the *kumara*. According to Karsten it was clear enough now that the sweet-potato was prehistoric in Polynesia and adjoining Melanesia, but "recent researches" had failed to find proof of its prehistoric existence in America! Friederici's theory, rejected earlier, was now spontaneously reversed; Karsten held that the sweet-potato could not have grown in the New World before the arrival of the Spanish caravels. He said (*Ibid.*) of this much debated crop plant: "... when Columbus and the first Spaniards arrived in the New World it seems that it [the sweet potato] was not yet known there. It was introduced there later during Spanish times, and indeed from Polynesia. It is shown with great probability that this happened through the expedition of Alvaro de Mendaña, who discovered the Solomon Islands in 1567 and arrived in Peru a couple of years later."

It is difficult not to suspect that the inaccurate data and unfounded argument behind this hasty claim were due more to a desire to preserve *status quo ante* than an effort to serve the cause of science. The hypothesis is only mentioned here because it has already been widely spread through the daily press, and has been referred to by certain writers as authoritative. Karsten (*Ibid.*), who says he found the earliest reference to the sweet-potato in 1582, has overlooked the rather important fact that a plant (see Plate LXIII **1**) is not entirely an historical subject matter but a vegetable growth, and botanists know the sweet-potato as an American plant. (Safford 1925; Merrill 1946; Carter 1950; Sauer 1950; etc.) He has also overlooked the historical fact that the sweet-potato, commonly called the *batata*, was first observed on November 4, 1492 by Columbus. (Safford 1925, p. 117.) It was before this discovery under native cultivation not only in the Antilles, but scattered along the American culture centres from north of Mexico to the south of Peru, and even as far into South America as the Quillota Valley near Valparaiso on the coast of central Chile. (Latcham 1936.) As Best (1925 b, p. 53) says: "Columbus found it [the sweet-potato] in cultivation in the West Indies, the natives of Hispaniola planting it as the Maori did, in small mounds."[1]

Lovén (1935, p. 368) says of the batata (sweet potato) in the aboriginal Antilles: "Batatas played a great role in the diet of the Tainos. Oviedo [1535-48] names many varieties in Española. ... Nothing for certain can be said about the origin of the batata among the Tainos, but apparently it was brought over from South America with them. Already at the time of the Discovery, batatas were widely disseminated throughout tropical America, South America, Central America, Mexico (camotl) and even in the southern States..."

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[1] The same method of cultivating sweet-potatoes in mounds (9—10 ft. in diameter and 3 ft. high) is described by Ellis (1829, Vol. I, p. 46) from the Society Islands.

Yacovleff and Herrera (1934, pp. 273, 274), in their study of crop plants among the aboriginal Peruvians, show how the earliest Spanish chroniclers, such as Cieza, Cobo, and Garcilasso, describe the sweet-potato as an important culture growth in early Peru, with an immense geographical distribution and a variety of species. The same botanists also point out that the archæological museum in Lima contains "numerous pieces of Mochica [Early Chimu] ceramics which sculpturally reproduce roots of *Ipomoea batatas.*" Lastly, Safford (1925, p. 175) mentions sweet-potatoes among the dried foot staples found with ancient mummies in pre-Columbian desert graves on the coast of Peru, an occurrence which has also been pointed out by Harms (1922, p. 184) in his synopsis of the plant-remains archæologically discovered in prehistoric Peruvian graves. (See also Plate LXIII **3**.)

Against all this decisive evidence one wonders to which "recent researches" Karsten refers when he claims that Alvaro de Mendaña brought the sweet-potato into Peru from the Solomon Islands in 1569. When asked for further data, he declared[1] that the proof had been given by the late Erland Nordenskiöld. I have failed to find any such statement in any of Nordenskiöld's publications, but may quote the following statement from Nordenskiöld's *Origin of the Indian Civilizations in South America* (1931, p. 51): "Of extreme importance would be a thorough botanical examination of the remains of cultivated plants such as the sweet potato that Tello has discovered from the earliest higher civilization known on the Peruvian coast, viz. that of Paracas."

When Nordenskiöld in 1931 referred to Tello's discovery of dried sweet-potatoes in the Necropolis of Paracas, he knew perfectly well that this culture plant was not only pre-Spanish, but even early *pre-Inca*, on the central coast of Peru. To-day the Paracas culture has been shown through the Carbon-14 method to belong to the last centuries B. C.

The bottle gourd

The bottle gourd, or calabash, *Lagenaria siceraria* (or *Lagenaria vulgaris*), was widely spread in the Pacific at the time of European arrival. Throughout Polynesia it ranked among the earliest and most important of the culture plants. It was treasured since legendary times not only for its edible spongy interior, which was prepared for food in different ways, but much more so for its solid rind which had a variety of uses when dried, especially as a water-container or domestic vessel.[2]

The pre-European cultivation of the gourd in Polynesia has not aroused the same comment and discussion as that of the sweet-potato, since the gourd is probably not originally an American plant. And seeds of the gourd can be carried wide and far with migrants and voyagers in primitive craft much more readily than the sweet-potato, which has to be transplanted vegitatively as a tender and succulent tuber. Throughout Polynesia the gourd or calabash is referred to in ancient songs, proverbs, and descriptions of the earliest Polynesian deities and culture-heroes. In Hawaiian mythology the legendary Hilo of the ancient Fatherland sent the winds of the ocean out from his calabashes (Emerson 1909, p. 65), and in New Zealand Toi and his tribe are expressly stated to have had the gourd as early, or earlier, than any other plant. (Best 1925 b, p. 54.)[1] Best stresses that the gourd was cultivated to a considerable extent by the Maori in pre-European days in all suitable localities, and he says (*Ibid.*, p. 129): "The gourd is honoured in Maori myth with a personified form, or parent, as is the case with the *kumara*." A South Island legend recorded by Stack (1878, p. 61) specifies "calabashes and kumaras" as the two specific crop plants brought by the vessel *Arai te uru* which was capsized off Moeraki in the earliest mythical pre-Maori era.

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[1] In a letter from Rafael Karsten published in *Svenska Dagbladet*, Stockholm, December 2, 1949.

[2] When intended for use as a water-container, a matured gourd of suitable size and shape was picked and dried before a fire or in the sand, and the spongy interior was often left to decay. A small aperture cut in the rind was then sufficient to remove the contents, and the interior surface was cleaned by shaking gravel inside it. The rind was finally suspended in the smoke of a fire to harden like wood.

Towards the end of last century, botanists had begun to agree about the formerly disputed cultivation of the gourd in aboriginal America. Philippi (1890) had demonstrated that the *Lagenaria* was domesticated, although apparently not known wild, on the Pacific coast of South America before the arrival of the Spaniards.

Later, in his various publications on plant domestication, O. F. Cook (1901; 1903; 1912; 1918; 1925) became the leading sponsor of the much disputed theory that an extensive series of culture-plants had had their origin in prehistoric South America, whence they had been carried down wind into the Pacific by prehistoric voyagers. In 1925 he published his paper "Peru as a center of domestication", in which he pointed out the extreme antiquity and importance of primitive agriculture among the aboriginal cultures of that part of the world, claiming a New World origin for many debated aspects of prehistoric plant domestication. He also points out (*Ibid.*, p. 106) what had already been noted by several others, including Friederici (1915), that the bottle gourd was one more essential crop plant of ethno-botanical importance to the student of the Pacific, since it too was shared by the ancient Peruvians and the adjacent Polynesians before the coming of the Europeans.

As Carter (1950, p. 167) says, it is inevitable that attempts to account for the occurrence of the same genus and species of the cultivated gourd in the New and Old Worlds should include a suggestion that the plant had floated across the ocean by itself. Carter shows the futility of such a theory, as the *Lagenaria* has not the qualities required either to survive lengthy soaking, nor to compete successfully under saline conditions on a foreign shore. We may add that the everpresent activity of pelagic crabs, boring crustaceans, and other surface patrolling animals in these waters, as encountered and observed from the Kon-Tiki raft (Heyerdahl 1948 b), would not permit any gourd to drift for thousands of miles without being perforated and damaged, if not entirely consumed, long before it could take root and flourish on a foreign shore.

Add to this Sauer's (1950, p. 506) comment on the gourd; "It is in no sense a strand or marsh plant. The theory of its accidental dissemination involves, in addition to the undamaged transit of an ocean, a waiting agriculturist who carried it in from the seashore to a suitable spot of cultivation."

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[1] In New Zealand the gourd together with the *kumara* and a wild fern-root, ranks among the most important vegetable crops. From the time of Toi and the earliest Maori settlers until the European period, the baked root of a wild fern has been a staple element in the Maori diet, especially in years when the domesticated crops were poor. A similar fern-root was a principal food staple among the non-agricultural fisher population on the Northwest American coast. Capt. Cook (1784, Vol. II, p. 374) wrote with reference to the Northwest Coast Indians of Prince William's Sound and Vancouver Island: "They also eat the larger sort of fern-root, mentioned at Nootka, either baked, or dressed in some other way;..."

The overwhelming probability of a Pacific transfer by man of this crop plant, too, therefore loomed large. Buck (1938 a, p. 315), observing this, turned away from the Tuamotus and placed his theoretical voyage for the Peruvian *kumara* in the Marquesas, with the following comment: "The Tuamotu atolls are eliminated, because there is a possibility that the seeds of the gourd (*Lagenaria vulgaris*) were introduced into South America from Polynesia in pre-Columbian times; and such gourds do not grow on the Tuamotu."

Emory (1942 b, p. 129) writes: "Now, if the *Lagenaria* was introduced into South America, we should expect the Polynesians to have introduced it, for it is too much to expect Peruvians or others from South America to have reached Polynesia and returned, without possessing ocean-going vessels capable of performing long voyages. The calabash vine, then, if botanists are able to prove that it could only have reached America by human agency, may prove even more decisive than the sweet potato as evidence that the Polynesians reached South America."

Eames and St. John (1943, p. 256), reviewing the botanical side of the problem raised by the prehistoric existence of the *Lagenaria siceraria* both in Peruvian and Polynesian agriculture, seem to refer to Buck's hypothetical sailing expedition to Peru when they wrote: "It is now believed that before the 13th century Polynesian voyagers starting from Mangareva or the Marquesas sailed eastward, reaching Peru, and then returned. Such a voyage would provide a possible explanation of the introduction of the sweet potato... to Polynesia, and the gourd... to South America."

The timing "before the 13th century" admittedly allows some flexibility as to the date of this hypothetical Marquesan return voyage, but Buck apparently meant that the expedition happened in the centuries of daring Polynesian long-range voyages at the opening of the present millennium. A time limit subsequent to 500 A. D. is at any rate granted, since Buck himself brings the earliest settlers eastwards to Polynesia in that period. Merrill too (1950, p. 9) quite recently says that the gourd may owe its presence in pre-Columbian America to the Polynesian voyagers, adding that these definitely did not reach their islands until after 500 A. D. and that they made their theoretical visit to South America only in the twelfth century A. D. The chronological error of such theories will shortly be demonstrated.

Obviously, a voyage by Polynesian craft between 500 and 1200 A. D. could have carried *Lagenaria* seeds to a *kumara*-growing area of coastal Peru, and thus caused the gourd to be cultivated in the New World before the arrival of the Spaniards. But there are other considerations to take into account: for instance, whether or not the gourd was unknown in America prior to 500 A. D., and in what succession the gourd has spread among the different areas of the primitive agriculturists' world. The necessity of such considerations was first pointed out by Nordenskiöld (1931, p. 269), who wrote:

"In pre-Columbian times there was at all events one cultivable plant which was common to Oceania and America—the calabash, *Lagenaria vulgaris*. ... Every sort of knowledge concerning the history of *Lagenaria vulgaris* in America is, therefore, of great interest. ... It appears from Tello's exceedingly interesting excavations at Paracas that objects manufactured from the rind of the calabash fruit are there found in the earliest strata, dating farther back than the knowledge of silver and copper on the Peruvian coast. *Lagenaria* was even known to the very primitive fisher population of Arica [on the coast below Titicaca], where ancient graves have been studied by Uhle and the prominent botanist Skottsberg. These ancient fishermen had no pottery, and were unacquainted with the art of weaving. Thus it must have been very far back in time that *Lagenaria* was cultivated in America. ... Of *Lagenaria* the Indians formerly manufactured, and still manufacture, a great number of household utensils and other things, among which may be especially noted the containers formerly used in Colombia and eastern Peru as receptacles for the lime that is chewed with coca leaves. A corresponding use for calabashes is found in Melanesia, where they are used as lime containers by betel-chewers. Both in America and Melanesia, the lime is extracted from the calabash bottle by means of a rod or spoon which frequently does service also as a stopper.[1] ... If it be actually proved that *Lagenaria* seeds must have reached South America from some Oceanic island, e.g., along with the crew of some weather-driven ship, it is, of course, not unreasonable to suppose that the Indians may have learnt other things from the same quarter. Some few Oceanic culture elements might thus, with a certain degree of probability, have arrived in America simultaneously with *Lagenaria*."

Nordenskiöld therefore emphasized the "exceedingly great importance of knowing the history of the *Lagenaria* plants," and considered this particular crop plant "the principal proof of pre-Columbian communication between Oceania and America."

Cogniaux and Harms (1924) give special attention to the history of our knowledge of *Lagenaria vulgaris* in their treatment of its genus. We learn (*Ibid.*, p. 207) that among the early botanical pioneers, Linneaus had assumed an American origin of the plant, whereas De Candolle placed it in India and did not believe that the plant existed in America at all before the arrival of the Europeans. But this latter opinion was, however, refuted by Gray and Trumbull, who produced evidence from the writings of the early Spanish chroniclers to the effect that the bottle gourd was known in America before Columbus. Gourds and *Lagenaria* seeds were also soon discovered by archæologists in prehistoric Peruvian graves. The immense antiquity of the bottle gourd among the culture-people of Africa, however, was established by both finds and illustrations placing its cultivation in the earliest cultural era of ancient Egypt. There its cultivation dates back into the third millennium B. C., and was already then widely spread. Naudin therefore suggested that this crop plant had reached America from the Old World with some stray craft.

Cogniaux (*Ibid.*, p. 206) himself accepts its prehistoric spread to the New World, and holds the probable original home of the plant to have been in tropical Africa, possibly in South Asia.

The dating of its spread from the Old World to the New has more recently been considerably pushed back by the archæologists, first by Tello and later by Bird. The latest excavations by Bird have shown that the gourd was present in America millennia before the Polynesians were present on the Pacific islands. (See Whitaker and Bird 1949; also Bird 1948; 1949.) Thousands of gourd shell pieces were excavated by Bird at Huaca Prieta in North Peru, and identified by Whitaker as of *Lagenaria siceraria* (L. *vulgaris*). They originated from an early pre-pottery culture whose economy was based on agriculture and fishing, and were tentatively dated by Bird as locally deposited between three and five thousand years ago, long before the local population even had begun to cultivate maize. Whitaker (1948, pp. 49-68) has demonstrated the presence of *Lagenaria* in early archæological sites both in North and South America. Obviously then, the early Americans had utilized the gourd as a crop plant in periods greatly antedating any Polynesian era, and a transfer of *Lagenaria* seeds by hypothetical canoes fetching *kumara* from the Marquesas would obviously have occurred far too late to account for the presence of the bottle gourd in Peru.[1]

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[1] Some degree of contact between Peru and Melanesia would be inevitable in the early Polynesia era, before the Maori-Polynesian arrival, since the settlers of the East Pacific, if coming from Peru, would have encountered no human beings till they reached Fiji. This is a fact of paramount importance to bear in mind. The evidence showing that the gourd was also put to strikingly analogous uses in historic Polynesia and Peru will be shown when we come to musical instruments. (Part X.)

The fact that the people known to us as Polynesians were non-existent in the Pacific in a period between 3 000 and 5 000 years ago is clear enough from all the accumulated knowledge of Polynesian history and archæology. It would also, to say the least, be pure speculation to speak of other (pre-Polynesian) settlements on the islands in such a remote period. Theories of more or less direct South Pacific crossings up wind in primitive craft from Asia to South America between 3000 and 1000 B.C. are hopelessly impractical, just as much so as are the gradually disappearing speculations involving travels along sunken East Pacific "land bridges".

Recent botanical discoveries to be cited on later pages, make it inevitable that voyages from antipode to antipode in the teeth of the trades are likely soon to be tentatively propounded—in fact they have already been so—by serious observers who have nothing in mind but to try to explain how certain Old World crop plants, like the *Lagenaria*, could have fallen into the hands of American Indians before the arrival of the Spaniards. If such speculations are ever to bear fruit, it is of compelling necessity for those who seriously try to solve the problem that they acquire some practical information pertaining to oceanic voyaging in the craft of the centuries B. C. and, furthermore, consult carefully the geographical lay-out of water and land-masses, with due consideration to tropic winds and currents.

We know that the gourd was widespread as a crop plant in ancient Egypt and neighbouring countries as early as the third millennium B. C. The earliest known date for the gourd in Southeast Asia is in China just before the Christian era, according to early Chinese writings. (Cogniaux and Harms 1924, p. 207.) At this time the gourd could very likely have reached China and the coastal areas on the way thither by the growing trade which sprang up in this period with India and leading civilizations farther west.

Apart from geographical and navigational considerations, we cannot bring the gourd to America from China or Indonesia until we know at least that the gourd was cultivated in the latter region *earlier* than among the ancient Peruvians. We have no evidence to this effect, but much to the contrary. The Polynesian voyagers of 500-1300 A. D. could not have carried the gourd from Southeast Asia without bringing with it other cultural features of the modern iron age epoch that had engulfed Indonesia and China by that time. Let us therefore return to the American gourd, so important in early Peruvian archæology.

On the Pacific side winds and water flow away from the inter-tropical belt of America where the gourd was grown. On the corresponding Atlantic side the picture is reversed, as both approach from the coasts of Africa. For some inexplicable reasons, the South Atlantic has always been considered a definite barrier for human craft from Africa, whereas the South Pacific has been regarded quite differently. A prominent anthropologist like Boas (1925, pp. 21, 28), says in one breath about aboriginal America that: "I do not deny that there are indications that may point to the introduction of certain details from Polynesia, ..." and in the next: "On the Atlantic side the broad expanse of water made immigration impossible." Also (1929, p. 110): "Since the end of the Tertiary the Old World and the New have been separated by the Atlantic Ocean so that the immigration of living beings in this direction has been impossible ever since the land connection in the far north disappeared."

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[1] Parallel with the findings of actual calabash utensils and fragments in the earliest culture strata of Peru, was the iconographic reproduction of bottle gourds together with reproductions of *kumara* in Early Chimu pottery.

It is difficult to understand this discrimination when one recalls that the distance between Africa and South America is 1 700 miles, whereas the distance from Easter Island to South America alone is 2 000 miles, to say nothing of the remaining 8 000 miles of water between Easter Island and Asia. Seeing that the gourd was in cultivation in North Africa in the third millennium B. C., it may well have been in the hands of voyagers southwards from Madagascar or beyond Gibraltar in periods antedating its introduction into New World agriculture. The circum-Atlantic distribution of the gourd includes the whole of West Africa with its principal Atlantic Islands (Cogniaux and Harms 1924, p. 202), as well as Brazil, the West Indies, and the rest of tropical America; and with due consideration for geography, chronology, and navigational feasibilities, we find no apparent reason why *Lagenaria* could not have been introduced to the early American culture peoples across the Atlantic.

Merrill (1950) has recently supplemented his interesting series of anti-diffusion publications by contributing a most vigorous attack against the modern school of plant geographers who have found reason to argue from available botanical evidence that America was *not* totally isolated by sea before the coming of Columbus. It is important to note that he makes what he terms "occasional exceptions" (*Ibid.*, p. 7): "Thus it is now clear that the Polynesias did transport the sweet potato (*Ipomoea batatas* Poir.) from western South America to the Pacific Islands a few centuries before Magellan circumnavigated the globe in 1521." Also (*Ibid.*, p. 9): "One other case that occurs to me is the relatively unimportant[1] gourd (*Lagenaria siceraria* Standl.), for it is clear that this cultivated plant did occur in both hemispheres before Magellan's time."

Merrill's opinion of the sequence in which the gourd was carried from Africa to America in pre-Columbian time is as follows (*Ibid.*): "Such evidence as is available points to tropical Africa as its original home, but when and how it attained its more or less universal pantropic distribution is not clear. It may owe its presence in pre-Columbian America to the Polynesian voyagers, ..." Is it not irrelevant to argue *against diffusion*, and yet suggest that the gourd may have travelled from Africa to America *by way of Polynesia*? Merrill (*Ibid.*, p. 10, etc.) is most emphathetic in stressing that no man reached—and still less crossed—the Polynesian part of the Pacific prior to 500 A. D. How then can this be the road by which the gourd reached America sometime well before 1000 B. C.? Is it not more appropriate to propose that the African gourd may have travelled down-wind the short distance between tropical Africa and tropical America, and thence passed to Polynesia, together with the sweet-potato, in a later period?

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[1] Merrill (*Ibid.*) adds that it is only as a food item that *Lagenaria* is unimportant. It was indeed, owing to its rind, one of the most important crop plants both in prehistoric Peru and Polynesia.

Emory (1942 b, p. 134) wrote: "...as long as the gourd seems to stand as evidence that the Polynesians reached South America in early times, and the sweet potato as evidence that they returned, it will appear possible that some of the parallels between Polynesia and the coastal regions of the Americas are due to cultural borrowing."

The importance of such parallels certainly do not decrease when we note that Polynesian sailings would be far too late to introduce the gourd to America, whereas Peruvian voyagers of 500 A. D. or thereabouts could very well carry both their *kumara* and their gourd to any of their settlements in Polynesia. (See Plate LXIV.)

The giant gourd

We cannot discuss the *Lagenaria* without mentioning also the giant gourd, the *ipu nui* of the aboriginal islanders in Hawaii. This plant was met with when Captain Cook and his men discovered the islands. We learn (Cook 1784, Vol. III, p. 150): "The gourds, which grow to so enormous a size, that some of them are capable of containing from ten to twelve gallons, are applied to all manner of domestic purposes; and in order to fit them better to their respective uses, they have the ingenuity to give them different forms, by tying bandages round them during their growth."

These colossal calabash containers, we learn, were used among other purposes as containers for water and "salted provisions", and must therefore have been of great practical value in the early era of long-distance voyaging. (See further Brigham 1908, etc.) Today the *ipu nui* has become extinct. (Eames and St. John 1943, p. 253.) Hillebrand (1888, p. 134) described the *ipu nui* as *Cucurbita maxima*, and stated that in Hawaii the fruit often attained a diameter of several feet. It seemed, he said, to have been unknown on the other Polynesian islands. This is also Brigham's view (1908, p. 137). Ellis (1829), later quoted by Best (1925 b, p. 134), said that in Tahiti the drinking water "is contained in calabashes, which are much larger than any I ever saw used for the same purpose in the Sandwich Islands, but destitute of ornament." Whether Ellis, who had lived both in Hawaii and Tahiti, was including in this comparison the Hawaiian *ipu nui*, or only referring to the common gourd which also grew there, is not specified.

On the assumption that the Polynesians had carried the common gourd, *Lagenaria siceraria*, to aboriginal Peru, Buck (1938 a, p. 313) saw a problem caused by the presence only in Hawaii of the *ipu nui*, since it had been termed by botanists *Cucurbita maxima*. With this botanical name, the *ipu nui* was grouped with pumpkins and squashes rather than with the true gourd, which has only one single species, *Lagenaria siceraria*.[1] Now, as Buck pointed out: "The original home of pumpkins, squashes, marrows and melons is in America. The question is how did the large gourd get to Hawaii?"

Buck suggested that the large gourd was wrongly placed with the pumpkins, and that in reality it might have been a *Lagenaria* that had come to Central Polynesia as an ordinary gourd and thence have been developed into a large variety in Hawaii. His supposition was confirmed by the botanists Eames and St. John (1943, p. 259), who examined microscopically the wall of the Hawaiian *ipu nui.* Their conclusion, based on anatomical study, was that this remarkable fruit was an extreme form of gourd rather than a squash. If so, the *ipu nui* is covered by the above discussion of *Lagenaria siceraria* and its migratory routes. Since *Cucurbita maxima* was cultivated by various aboriginal peoples in Central and South America, and since Wittmack (1888, p. 379) found seeds in prehistoric Peruvian graves at Ancon which he identified as *Cucurbita maxima* in the same years in which Hillebrand referred the Hawaiian *ipu nui* to the same species, it would be interesting to know whether the old Peruvian specimens were also a giant variety of gourd rather than a squash. If this was so, then the extraordinary giant variety surviving in Hawaii could have had a long evolution among expert agriculturists and plant domesticators in ancient Peru, instead of representing a sudden evolution to enormous size in Hawaii, after the 14th century termination of contact between Hawaii and Central Polynesia. To develop such a giant variety may take a long time; to lose it can be a quicker process, as has been seen in Hawaii in historic times.

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[1] For *Cucurbita* see also De Candolle (1887), Zimmermann (1922), Bailey (1929; 1943; 1948), Carter (1945), Whitaker and Bird (1949), Whitaker and Bohn (1950), etc.

We may at least note with Sauer (1950, p. 506) that the ancient cultivation of *Lagenaria* in Pacific South America had, by means of selection, given rise to highly specialized forms with a wide range of size and shape; thus, for instance, "in Colombia a large form exists that is grown in the cool Highlands of Antioquia." Further, on the coast of North Peru, Whitaker and Bird (1949, p. 3) excavated *Lagenaria* containers of exceptional size among gourds otherwise under 22 cm in diameter: "One rim fragment of this latter type, found in the top level of the preceramic debris, has an indicated diameter of 40 to 42 cm. Another, found midway between this and the M layer, apparently measured 34 cm in diameter."

These large and specialized forms concur as well in species as in size and usage with the *ipu nui* of aboriginal Hawaii, and yet they antedate aboriginal agriculture in Hawaii by many centuries. (See Plate LXIII **6**.)

The 26-chromosomed cotton

When we include cotton in our migration analysis immediately after considering two of the principal Maori-Polynesian crop-plants, the *kumara* and the gourd, we have exclusively in view the earliest Polynesian island era. Furthermore, the recent discoveries of Hutchinson, Silow and Stephens (1947; 1949) have contributed evidence which undoubtedly will have the most far-reaching consequences primarily on American anthropology, and next on the question of sailings from Peru to Polynesia in the early island period.

In their important study of *The Evolution of the Gossypium and the Differentiation of the Cultivated Cottons*, Hutchinson, Silow and Stephens (1947) have demonstrated that the cultivated cottons of the New World are clearly distinguishable from those of the Old, and that all cottons of the world can be arranged in three different groups according to the size and number of their chromosomes.

All Old World cottons have only 13 large chromosomes and constitute one group. The two other groups belong to the New World and constitute a) the wild American cotton which has 13 *small* chromosomes, and b) the domesticated cottons produced by the aboriginal American culture-peoples, which have 26 chromosomes (13 large and 13 small).

Disregarding the parts of their study which is of purely botanical interest, we may consider here the essence of their findings which have a direct bearing upon the activity and voyaging of early man.

In the remote period antedating human activities in plant domestication, the wild cottons of the world had gradually differentiated into the two distinct wild types with their widely distinct genoms, one found in Africa and Asia (with 13 large chromosomes), and the other in America (with 13 small chromosomes). The Old World cotton with its 13 large chromosomes was first brought under cultivation by man, perhaps in southern Arabia, northeast Africa, or Sind, and originally maybe for its oily seeds. The next stage was that at a very early date *linted* cottons had been developed under domestication, and civilized people far back in Old World history began to spin and weave cotton cloth.

Then suddenly, in a more recent time, but before the arrival of the Europeans, the same domesticated Old World cotton appeared in aboriginal America, where it was used by the leading New World culture-peoples to produce their own local 26-chromosomed cotton.

The genetic analysis shows that the *cultivated* American cottons of aboriginal Mexico and Peru contain both the introduced Old World and the wild American set of chromosomes. This shows that the imported Old World genus and the local wild genus must have been grown alongside each other and by crossing doubled the chromosome numbers.

The study of the special cotton species domesticated by the American high-cultures before the arrival of Columbus proves, as stressed most strongly by the botanists referred to above, that tropical America was reached by Old World culture-peoples in pre-Columbian time. They were able to draw two more important conclusions. Firstly, those who introduced Old World cotton into pre-Columbian America were no primitive barbarians; cotton cultivation implies a high degree of aboriginal civilization, with permanent settlement, agricultural knowledge, and the knowledge of spinning and weaving cloth and cotton fabrics. Secondly, they must have been seafarers; for, although most American aboriginals are descended from primitive Asiatic migrants who came the northern way, along the route from Siberia to Alaska, the introducers of cotton cannot have come that way. The successful introduction of Old World cotton into America necessitates a journey in tropical or sub-tropical latitudes and a direct arrival in the warm central section of the New World. Cotton domestication in aboriginal America included, broadly speaking, the West Indies and the high-culture centres from Mexico to Peru, and somewhere within this warm area the cotton domesticators must have come ashore from craft that had travelled in tropical waters. At no known period did the Behring Strait or the Aleutian chain of islands possess the climatic conditions requisite for the passage of cotton cultivation. (See also Sauer 1950, p. 538.)

Thus in a round-about way, through a genetic cotton analysis, botanists have been able to produce the most weighty evidence to the effect that the old hypothesis of parallel and independent evolution behind all New World cultural growth ought to be seriously reconsidered. The gourd could have come with drift voyagers of a rather *primitive* culture level, the cotton could not.

The next question to arise would naturally be: had the American cotton domesticators brought the Old World genus across the Atlantic or across the Pacific? This is where Polynesian anthropology is directly concerned. It is obvious that no immigrants to America would cross half the world's surface from Asia to Peru with a bag of cotton seeds without planting some on the intermediate stepping-stones and island settlements on their way. *A priori*, if the domesticated Old World cotton had reached America across the Pacific, then Old World cotton would be found on some of the inhabited islands en route. If, however, oceanic migrations, as held by the present writer, have followed the natural movements of winds and currents, then the Pacific is not likely to have been affected by this early transfer to America, which more probably would have resulted from a far shorter and more feasible crossing of the South Atlantic. But in this case it is more likely that domesticated cotton reached Polynesia secondarily from aboriginal *America*, since the *kumara* and gourd producers of Peru were quite familiar with cotton domestication many centuries before Christ. In fact, although British Columbian invaders of Polynesia during the 11th or 12th centuries would bring their own bark-beater and *tapa* manufacture and spread this simple method over all the tropical islands, we can hardly conceive Peruvian voyagers of the 5th century A. D. or thereabouts settling the islands in the adjacent ocean without attempting to introduce cotton plants.

So we have now a very interesting opportunity to test and trace the migratory direction of cotton in the Pacific. We do actually find that cotton was brought by aboriginal man to Polynesia. But in the subsequent Maori-Polynesian period it was abandoned and left to grow wild. As with the blood groups of man, so with the chromosomes of his cultivated cottons, a strong differentiation has taken place which marks a contrast between Asia and America. It is accordingly possible for us simply to examine the species of the Polynesian cotton, and thereby find out whether it was dropped on the way from Asia (with 13 large chromosomes), or exported from aboriginal America (with 26 chromosomes). This examination was carried out by Hutchinson, Silow and Stephens (*Ibid.*) in their effort to trace the sailing route to America of the domesticated Old World cotton. They found the Polynesian cottons to have 26 chromosomes, like the American cultivated cottons.

At the time of European arrival two species of cotton, both growing wild but bearing true lint, were discovered in Polynesia. Both were found different from Old World cottons and were considered endemic in their islands; they were termed respectively *Gossypium taitense* (Central Polynesian cotton) and *Gossypium tomentosum* (Hawaiian cotton). A further examination of the Central Polynesian cotton has proved that it is not an endemic species at all; that it does not merely possess the 26 New World chromosomes, but that it is simply a form of the New World *Gossypium hirsutum* var. *punctatum*. (Hutchinson *et al.*, 1947, p. 74.)[1]

As pointed out by the present author (1950 a, p. 32),[2] the identification of the former *Gossypium taitense* of Central Polynesia as the early American *G. hirsutum* var. *punctatum* is a proof that the prehistoric transfer went *from* America *to* Polynesia, since the species according to the genetic analysis arose under cultivation in the New World. The same ethnobotanical conclusion was almost simultaneously sponsored also by the botanists Carter

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[1] Silow writes (letter to the author dated Jan. 29, 1952): "The *punctatum* cottons are associated with the Maya country and other areas in Central America and the Greater Antilles, and the *taitense* forms are xerophytic ecotypes of this species occurring in the wild." *Gossypium hirsutum* var. *punctatum* is also listed in the *Handbook of South American Indians* (Steward 1946, p. 5) as one of the two cottons cultivated in prehistoric Peru, but the authority for this statement is not given.

[2] MS. with publishers March 1949.

(1950, p. 169) and Sauer (1950, p. 536). In his stimulating paper "Plant Evidence for Early Contacts with America", Carter shows that after the American variety *punctatum* had evolved locally from its strictly American ancestral form (*G. hirsutum*), it had been carried by man out of tropical America and into the Pacific island world, where it was gradually abandoned as a crop plant, but survived sporadically in a wild state, from the Marquesas Group in the east as far west as Fiji.[1]

In his equally interesting report on the latest ethno-botanical data on "Cultivated Plants of South and Central America," Sauer (1950) reached the same general conclusions as Hutchinson and his associates. He shows like them that not only are the New World lint-bearing cottons all tetraploids (i.e., 26-chromosomed), but including the Polynesian species and varieties, they are the only tetraploids in the cotton genus. He also notes with Harland's gene diagram and observation of recessives that there is no definite 'wild type' in any of these species. He therefore finds that the cotton genes and chromosomes in their geographic distribution point to the arrival in aboriginal America of a cultivated Old World cotton which, through being fertilized by a wild New World plant, originated in turn the cultivated American cotton which subsequently spread into Polynesia and Fiji.

Sauer writes (*Ibid.*, p. 537): "This is a remarkable dual task to assign to birds, which do not eat *Gossypium* seeds, or to the slight currents of the tropical Pacific, with *Gossypium* being most unsuited to dispersal by floating." Further: "A land bridge across the mid-Pacific is one of the unlikeliest things of all unlikely things to have happened in the crustal history of the earth." Admitting on the other hand that the original wild 13-chromosomed parent of the genus might have spread over the world in remote geological periods when American and Atlantic geography was different from today, the author adds with regard to the cultivated forms: "Neither the way of Alaska nor continental drift [separating South America from Africa] could apply to the much later time when the tetraploid group originated. Nor does such a hypothesis help to explain the occurrence of cottons with strong American parentage, ranging from the Galápagos to Fiji. Perforce then we must consider human agencies in the geographic distribution of the *Gossypium* genus. The problem relates entirely to the lint-bearing forms useful to man."

Sauer (*Ibid.*, p. 536) also refers to the specific cotton of Tahiti and other Polynesian islands, which were formerly thought to be endemic to Polynesia, but recently discovered "to be indistinguishable from the xerophytic 'algodon brujo' of Puerto Rico," a form of the American G. *hirsutum var. punctatum* as referred to above. Thus, as Carter (1950, p. 169) emphasizes, the genetic study of cotton "has changed our understanding of the cottons in the Pacific Islands. All but the Hawaiian cotton have now been shown to be but derivatives of American domestic forms..."

The case of the Hawaiian wild cotton is not less interesting. It has actually proved to be an isolated species endemic in the Hawaiian Islands. But its local distribution area and its true lint suggest former cultivation, and its chromosome number is 26 like that of the domesticated New World species. Hutchinson, Silow and Stephens (1947, p. 98) write: "The New World cottons are differentiated into three species between which genetic isolation exist. *G. barbadense* is the South American cotton, and *G. hirsutum* has its centre of variability in Southern Mexico and Guatemala. The third species, *G. tomentosum*, is endemic in the Hawaiian islands. The three intercross freely, giving fully fertile F_1 hybrids which exhibit considerable hybrid vigour."

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[1] When the Europeans discovered Tahiti in 1767 and made their first survey of the island, they observed "great plenty of cotton and Indego growing up the Country," and thought that some of the finer local cloth had been made from cotton. (Robertson 1766–68, p. 222.) Cook later collected cotton on the island, and Ellis (1829, Vol. II, p. 280) narrates how the missionaries at the beginning of the last century wanted to develop industry and export among the natives in Tahiti: "We therefore recommended them to direct their attention to the culture of cotton, one variety of which appeared to be an indigenous plant in most of the islands."

Referring again to the close relationship between the isolated Hawaiian cotton and the two continental American species, the same authors stress (*Ibid.*, p. 10) that the chromosome homology and fertility between them are high, and they form a natural Section (VIII Hirsuta). Furthermore, according to Harland, they show (*Ibid.*, p. 99) that the Hawaiian cotton seems more closely related to the cultivated cotton of ancient Peru than to the early Mexican species. The reference here made is to the second of the two cultivated cottons of prehistoric America, *Gossypium barbadense*, and we thus find that all known cotton in aboriginal Polynesia seem to have derived from some ancestral form in early America. *Vice versa*, relatives of both the two prehistoric cottons of ancient America seem to have found their way in prehistoric times out to Polynesia, where they have been subsequently abandoned and left to survive only in a wild state.

Hutchinson *et al.* (1947, p. 79) write: "If it is accepted that the *allopolyploid* cottons arouse under cultivation in the New World, it must be supposed that the wild *G. tomentosum* of arid plains in Hawaii is also a secondarily wild species. It bears true lint, and the chromosome pairing and genetic behaviour of hybrids between *G. tomentosum* and *G. barbadense* and *G. hirsutum* indicate that it is not much more distantly related to them than they are to each other. In this respect it resembles the endemic Hawaiian species of other Neotropical genera, of which Skottsberg (1939) stated that, 'The species may be endemic but are seldom strongly marked, standing close to American species.' The means by which Hawaiian plants reached the islands have been the cause of much controversy, and it may at least provide an hypothesis worth testing against the species of the other genera of the Neotropical group to suggest that in view of its close relationship to the New World cottons, *G. tomentosum* can only have reached Hawaii since the establishment of civilization in tropical America."[1]

The ethnological conclusion that civilized cotton domesticators must have carried the Central Polynesian cotton out of aboriginal America, and perhaps even the ancestral form of the wild Hawaiian cotton too, was bound to affect the current view of early American-Polynesian contacts. After the statement in his joint publication with Hutchinson and Stephens, Silow defended the interesting ethno-botanical discovery before the Pacific Science Congress in New Zealand (1949), and the evident inductive value of this important piece of botanical evidence has begun to work its way into the field of anthropology. (Steward 1949, p. 744; Heyerdahl 1949; 1950 a; Carter 1950, p. 167; Sauer 1950, p. 533; Jakeman 1950, p. 32; etc.)

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[1] The lint of the wild Hawaiian cotton, unlike that of nuclear Polynesia, represents just about the lowest limit of spinnability. But due to its endemic nature we cannot know with certainty the lint size of the parental form when it first reached Hawaii and spread wild over the arid local slopes. The genetic difference between the cotton of Hawaii and its 26-chromosomed American relatives can neither supply us with any information about the antiquity of their geographical separation. Differentiation of species does not proceed in proportion to time, nor does it follow any rule of geographical uniformity. If its parental form be a product of aboriginal American civilization, the date of its insular isolation cannot be exceedingly remote.

Carter (1950, p. 169) says of the Polynesian cottons: "Even the endemic cotton of Hawaii is suspect. Its 26 chromosomes and its possession of spinnable lint suggest American origin and a history as a fiber plant. The presence of sweet potatoes shows that plants of American origin were carried that far. The bigger mystery concerns why it was carried. Was cotton originally carried as a source of oil seeds, as suggested by Hutchinson, Silow, and Stephens? Or was weaving later given up in the Pacific area for bark cloth? Is part of the answer to the latter to be found in Bird's finding that the weaving in his early Peruvian site was done without the use of the heddle? Would bark cloth be able to replace such primitive weaving, though it would probably not replace true loom weaving? Or, was cotton weaving little understood and unable to replace an established bark cloth industry in Polynesia?"

Leaving these questions open, Carter merely shows that man alone can have been the agent of the pre-Columbian spread of these cottons. Any other attempted explanation would be unreasonable and improbable. Cotton seeds cannot spread alone by wind or sea from Peru to Polynesia, and there have been no land bridges. He even shows (*Ibid.*, p. 179) that: "The seeds of cotton... rapidly lose their power to germinate when exposed to moist air."

Sauer (1950, p. 536) says of the wild but linted cotton of Hawaii that it may well be endemic, but it still remains a tetraploid species. "It may be an early divergent from the ancestral hybrid cotton of the South American mainland, carried to Hawaii before the *barbadense* and *hirsutum* species formed. No tetraploid cottons exist anywhere else in the world, and the whole lot has a common origin. How then, may we explain the connection between Peru, the Marquesas, and Fiji, with no such cottons existing west of Fiji?"

Beyond answering that man, and neither birds nor the elements, must have carried these Polynesian cottons out of South America, Sauer goes no further, although he points to the early area of the Mochica (Early Chimu) and Chiiou cultures on the coastal plains of North Peru as a possible source of all these cotton forms.

On the assumption that the Asiatic invasion of Polynesia by Yellow-brown man reached the islands by way of Northwest America at the beginning of the present millennium, we have found the absence of the loom and weaving among the present island population to be a natural consequence of its absence in Northwest America, just like the absence of pottery.[1] In the same way it is only natural that an earlier population sailing west from Peru would have brought with them linted cottons of the early American species. This sequence of migrations into Polynesia would leave no apparent problem as to the original introduction *and subsequent abandonment* of the 26-chromosomed American cottons.

Cotton is apparently as ancient as gourd in the archæological sites of the New World. It is interesting to note from Bird's archæological survey (Bennett and Bird 1949, pp. 258, 259) that gourd and cotton are earlier than maize and pottery in the refuse dumps analysed in Chicama and Viru, in North Peru. All but one of the oldest mummy wrappings from Ancon and Supe were of cotton. Bird (*Ibid.*) even states that "it is clear that the Peruvian textile craft is based on the use of cotton and not on wool or any other fibre." And "To a people possessing the tradition of cotton spinning and weaving the value of wool would be obvious once they moved into the habitat of the animals producing it, namely, the Peruvian highlands southward from the Ecuadorian border."

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[1] See part II.

The animals in question are the domesticated *llama* and *alpaca* and their wild cousins, the *vicuña* and *guanaco*. We do not know the wild forms of the former, but the vicunas were still caught in Inca times, when their fine and soft wool, partially white, were used by the Inca nobles. Bird (*Ibid.*) points out that "white wool is much more easily dyed than cotton", and the fact that Peruvian textile fabrics of wool were only secondarily adapted to an *original use of domesticated cotton lint* seems to indicate clearly enough that weaving was not thought of in Peru until the local immigration of some cotton-domesticating culture people. Before they arrived, the widespread American custom of beating bark-cloth seems to have been present also in Peru. Bennett (*Ibid.*, p. 120) says of the North Peruvian (Chicama Valley) cotton fabrics of this early agricultural period: "The fibres were twisted into string without the use of spindle whorls. True weaving is rare, with twined fabrics, looped and knotted pouches, and fishing nets more common. Twined baskets and reed mats were made. There are also pieces of pounded barkcloth, a surprising occurrence because this is generally more characteristic of the upper Amazon than the Andes."

The textile sequence in Peru accordingly seems to constitute an original use of tapa or bark-cloth, so important among many early Yellow-brown tribes. Subsequent introducers of gourd and plant domestication in early Peru also brought cotton and the manufacture of cotton cloth. The use of animal wool was only secondary and of more recent occurrence in the Andes.

Genetic analysis has left no room to doubt the westward spread of the Polynesian cottons. The much earlier route of the cultivated Old World cotton into America is still, however, largely open to conjecture. As the cotton domesticators can only have followed the tropic ocean belt of the Atlantic or the Pacific en route to the New World, it may be relevant to the present study to examine the feasibility of an early spread through Polynesia.

We have seen that no vestiges of Old World cotton have been found in Polynesia. In Melanesia cotton has only been found in Fiji, which was under strong Polynesian influence, and the local species was that of Central Polynesia which had its home in ancient America. Otherwise cotton had not reached Melanesia, Micronesia, New Guinea, or Australia. There are, in other words, no traces to indicate a spread of Old World cotton across the Pacific basin.

We must next bear in mind that cotton had reached America probably as early as the gourd. The twined fabrics, fishing nets and other artifacts of cotton referred to by Bennett and Bird (1949, pp. 120, 258) from the pre-ceramic deposits in North Peru were dated by them, and later verified by radio carbon analysis, as belonging to a period well antedating 1000 B. C. The cotton which gradually spread from Arabia or the Indus Valley eastwards through the coastal West Pacific only reached China about 700 A. D., and it never spread further into the Malay archipelago than to Java, Macassar in West Celebes, and the Philippines. This eastward spreading cotton was *G. arboreum*, which belongs to a section entirely distinct from the (American) cottons that reached Polynesia. (Hutchinson *et al.*, 1947.)

If we take the view that cotton reached ancient America by way of the Pacific, then we also find with Hutchinson, Silow and Stephens (*Ibid.*, p. 138) that the Polynesians cannot have been responsible for the transfer, as the cotton must have been carried *direct from India* and not from Indo-Malay territory. This means quite a sailing trip, more than half the circumference of the world, against the elements all the way. Our present knowledge of the original Old World home of domesticated cottons is rather indefinite. As Carter (1950, p. 170) says, Southern Arabia or Northeast Africa have been suggested. From there cotton could have been carried into the Sind, where the earliest known cotton fabrics belong to the ancient Mohenjo-Daro civilization. Silow (1949 b, p. 65) proposes a transfer in the opposite direction, showing that Mohanjo-Daro in the Indus Valley is actually the oldest dateable centre of cotton domestication, and that cotton spread thence through Persia into Asia Minor and the Levant countries. All this is on the Atlantic-American side of the world, even Mohenjo-Daro being removed from Pacific Peru by thousands of miles further than a full antipodal voyage. If cotton has spread from Mohenjo-Daro, Arabia, or Northeast Africa to America, it must have spread along the only feasible sailing route—by way of North or South Africa. (See map opposite page 641.)[1]

We can be abundantly certain that neither the Polynesians nor any imaginary voyagers from India in the early millennia B. C. carried cottons straight across the Pacific to the west coast of America. How cotton was brought to the early culture areas of Mexico, Peru and the West Indies is a question outside the scope of Pacific anthropology. We are only concerned here with the fact that when cotton was later carried out into the East Pacific, it was carried to Polynesia as the 26-chromosomed cotton domesticated by the American highcultures.

Although the direct ethno-botanical value of using the cotton plant in Polynesian research has been sufficiently apparent to botanists, many anthropologists have been rather reluctant, arguing that the tapa-making Polynesians would never travel to Peru to fetch unappreciated cotton seeds for their return voyage. This argument is sound enough. Therefore, in fact, there is even clearer proof in the case of Polynesian cotton than in that of the *kumara* (with its American name and origin) or the gourd (with its great American seniority) that the plant was carried to Polynesia by New World emigrants and not by Pacific islanders making a trip to Peru and back.

The coconut

We need no more evidence than the combined testimony of the *kumara*, *Lagenaria*, and *Gossypium* to prove by means of plant geography that aboriginal agriculturists had bridged the gap between tropical America and Polynesia before the coming of the Spanish conquerors. Yet the supply is not exhausted.

A very important food plant throughout the Pacific islands is the coconut palm, *Cocos*

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[1] According to Silow (*Ibid.*) the 13-chromosomed cotton spread among Old World cultures as follows: westwards as *Gossypium herbaceum*, and eastwards "...by way of the Delhi Cap and the Ganges Valley as *Gossypium arboreum*. The Sind Valley civilisation was founded on wheat, which is there near its southern limits of cultivation; only when this civilisation had reached the shores of the Bay of Bengal was rice found and domesticated, so that the further spread of cotton, south into Penisula India, and south-east into Burma, China, and the Malay Archipelago, was dependent on the extension of rice-eating civilisations."

nucifera, valued on the islands not only for the food staple of the nut in its various stages of ripeness, but for its thirst-quenching milk, the oil to be drawn from the kernel, and numerous useful appliances of the shell, the husk, the leaves, the wood, etc.

Although the original home and dispersal centre of the genus *Cocos* is not yet fully agreed upon by botanists, still its dependency upon human transfer for certain sections of its pre-Columbian spread is sufficiently demonstrated. The ethnographic value of the genus lies in the fact that it had acquired a wide trans-Pacific growth before the arrival of Europeans, and established itself as a domesticated palm of far-reaching importance to the colonies of aboriginal discoverers who had made their home on the tiny and often barren islands and atolls in the middle of the Pacific. Its direct bearing on the present study is limited to disclosing that there were trade relations or trans-Pacific contact in one direction or the other between tropical America and aboriginal Polynesia.

The coconut, also referred to as the 'cocoa-nut', had been encountered by Europeans in the Indian Ocean and Malaysia before America was discovered. Then it was met with in the tropical belt of the New World. Finally, when our own race pushed on from there into the open Pacific, its continuous distribution straight across the interjacent ocean was revealed. The natural problem for botanists became: Was the Cocos originally a native of tropical America, of the Pacific Islands, or of the Indo-Malay domain? All three hypothesis have been advanced and vigorously defended.

Miller (1752) expressed at an early date the opinion that the coconut must have had its home somewhere in Indonesia, whence it had been transported eastwards across the Pacific to all warm parts of America, including the West Indies. But R. Brown (1818) pointed out, as a "remarkable fact" respecting the geographical distribution of the palms, that the cultivated coconut with its trans-Pacific spread, and the African *Elaeis*, were the only two species known outside America of "an extensive and very natural section" that was otherwise confined only to America.

Martius (1823—50) supposed that the coconut must have been indigenous to the American side of the ocean, and spoke of the tropic regions of the Andes as a possible early centre. He described it as growing along the Pacific seashore of northwestern South America, especially in the vicinity of Guayaquil, and suggested that nuts had been carried with the currents from the islands near Panama straight across the Pacific.

Wallace (1853) described the coconut-palm as flourishing along the banks of the Amazon, but observed that the local natives made little use of it, and he thus concluded (p. 124) that this important palm was "a native of the Old World".

Grisebach (1872, p. 11) said: "The coconut palm (Cocos nucifera), ...like all the species of its family, derives originally from America..." And (*Ibid.*, p. 323): "To the south of Guatemala these forests are rich in palms. From S. Salvador as far as to the isthmus of Darien the coconut palm occurs as an indigenous product (0-1 600 feet), which has spread from this centre of vegetation, out across the coral islands of the South Sea, to other tropic lands. At Viejo in Nicaragua the oaks mingle with the palms, where they pass over into the savannahs."

Seemann (1856; 1873) saw the coconut palm, both wild and cultivated, on the Isthmus of Panama, but like Wallace he noted its limited importance to the local natives, and he therefore doubted a local origin of the palm. Arguing strongly against an early Malay knowledge of the coconut (see Part I), he supported the remaining alternative as to its origins. He considered the many varieties and uses of the nut in Polynesia to be a proof that these islands must represent its original home.

Drude (1881) argues that the East Indies cannot be the original home of the coconut since closely related species do not occur locally, and he concludes (col. 405): "Its true home-land is unknown, but it is probably Central America."

De Candolle is sometimes referred to as the founder of the school which claimed America as the original home of the coconut. (Patel 1938, p. 1.) But actually, in 1883 he reversed his own earlier view of 1855, and defended an Indonesian origin of this palm. De Candolle (1884, p. 432) himself admits that he took the latter view rather hesitantly. Although, as we have seen, he argued wrongly against the existence of gourd in aboriginal America, he admitted the prehistoric local growth of the coconut palm, and wrote (*Ibid.*, p. 431): "Oviedo, writing in 1526, in the first years of the conquest of Mexico, says that the cocoa-nut palm was abundant on the coast of the Pacific in the province of the Cacique Chiman, and he clearly describes the species. This does not prove the tree to be wild. ... Later the cocoa-nut palm was found on the western coast from Mexico to Peru, but usually authors do not say that it was wild, excepting Seemann, however, who saw this palm both wild and cultivated on the Isthmus of Panama."

De Candolle says that his original view was that of Martius, that the coconut had spread westwards across the Pacific from an indigenous homeland on the isthmus or islands near Panama. Only hesitantly did he alter this opinion, as he found more varieties and a greater spread of the coconut further westwards in the ocean. It is interesting, however, to note that the first argument listed by De Candolle in favour of a prehistoric spread of the coconut *from* Indonesia *to* Central America (*Ibid.*, p. 433) was his belief that a natural current drift in the Pacific would go from the *west* to the *east*. His second argument was of a kindred nature: "The inhabitants of the islands of Asia were far bolder navigators than the American Indians. It is very possible that canoes from the Asiatic Islands, containing a provision of cocoa-nuts, were thrown by tempests or false manoeuvres on to the islands or the west coast of America. The converse is highly improbable."

Without intruding upon the botanical controversy, we may suggest that both these arguments are of very doubtful value. De Candolle has no purely botanical arguments to add to the above in defence of an Indonesian origin of the coconut palm, but points to the great variety of names for it among the Malay tribes, and believes he can trace names for the coconut in Sanscrit. He says however (*Ibid.*, p. 435): "In spite of the Sanscrit names, the existence of the cocoa-nut in Ceylon, where it is well established on the coast, dates from an almost historical epoch. Near Point de Galle, Seemann tells us, may be seen carved upon a rock the figure of a native prince, Kotah Raya, to whom is attributed the discovery of the uses of the cocoa-nut, unknown before him, and the earliest chronicle of Ceylon, the *Marawansa*, does not mention this tree, although it carefully reports the fruit imported by different princes.[1] It is also noteworthy that the ancient Greeks and Egyptians only knew the cocoa-nut at a late epoch as an Indian curiosity. Apollonius of Tyana saw this palm in Hindustan, at the beginning of the Christian era."

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[1] Hornell (1945, p. 173) says that according to the ancient Sinhalese record of the Mahawamsa [Marawansa], which goes back well nigh two thousand years, King Aggrabodhi established in the sixth century A. D. a large coconut plantation in the south of Ceylon. A similar benefaction was made by King Parakrama Bahu in the twelfth century A. D. (See also Seemann 1865—73, p. 276; Patel 1938, p. 2.)

From these facts De Candolle assumed that the coconut palm had only reached the continent of Asia and Ceylon in comparatively recent times from somewhere in the Malay archipelago. Beccari (1877, 1887, 1910, 1917), Chiovenda (1921), Hill (1929), Werth (1933), Dahlgren (1936), Patel (1939), and others have followed a reasoning similar to that of De Candolle, believing the coconut to have originated in Indonesia or, more exceptionally, in Polynesia.

The contrary opinion of Martius and Grisebach is supported by Cook (1901, 1910-12), Guppy (1906), Copeland (1914), Hunger (1920), Brown (1931), Ridley (1930), and others, who on their side have succeeded in marshalling weighty botanical evidence in support of an American origin of the coconut and its relatives. Edmondson (1941) points to the unsettled nature of this botanical dispute, and says the whole case is made still more uncertain if it is correct that Berry has discovered a coconut in the Pliocene period of New Zealand.

The small-fruited fossil species described by Berry (1926, p. 184) from the Mangonui beds of northmost New Zealand is, however, not the *Cocos nucifera*, or true coconut, but a distant relative called by Berry *Cocos zeylandica*. Berry (*Ibid.*) himself points out that his discovery of a distinct fossil species in the late Tertiary of New Zealand has no bearing on human migrations. The true coconut as a food crop, he adds, may owe its present distribution to the agency of primitive man, in a much later period.

Merrill (1946, pp. 298, 300) is convinced that the coconut originated in some part of the Old World tropics, although he admits that the actual place "is somewhat of a mystery". He says: "Burkill, however, effectively shows that on the basis of its Malay names, which are all borrowed ones, that it is a late introduction into the Malay Archipelago." Merrill (*Ibid.*) also points out that the tribe or sub-family (Cocoinae) to which the coconut belongs "is predominantly characteristic of tropical America," in which specific locality a great number of genera are merely "narrow segregates from *Cocos*." (Namely: *Attalea*, *Maximiliana*, *Diplothemium*, *Jubaea*, *Orbignya*, *Arecastrum*, *Butia*, and *Claziova*.) Only two genera occur in Africa (*Elaeis*, *Jubaeopsis*),[1] and none in Asia, except the cultivated *Cocos* under discussion, which was found across the whole Pacific. Merrill adds: "The reference of numerous native tropical American species of *Arecastrum*, *Butia*, and *Glaziova* to *Cocos* has confused the issue. Assuming that Bentham and Hooker's and Drude's concept of *Cocos* as a genus, *sensu latiore*, be correct, then it would be surprising if all the wild species of a considerable genus should be natives of tropical America, and the one widely cultivated species dominant in the Old World and not an indigenous plant in America."

We are here touching the nuclear point in which Grisebach and his followers seem to have their strongest argument. Guppy (1906, Vol. II, p. 67) said: "It is not often we shall come upon such a striking instance of the principle that where the species are most numerous there is the home of the genus, as in the instance of Cocos. The Coco-nut palm has been carried around the world through the agencies of man and the currents, whilst the home of the genus is in America." Further: (*Ibid.*, p. 413): "The question of the antiquity of the coco-nut palm in Polynesia was discussed at length by Seemann, but for various reasons we cannot be absolutely certain whether or not it is an older denizen of the Pacific islands than the Polynesians. It is, however, to be inferred that it came originally from the home of the genus in America, perhaps as a gift brought by the Equatorial Current from the New World to Asia."

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[1] Cook (1942, pp. 577—580) claimed a Brazilian origin for the *Elaeis*, and this view he repeated a few days before his death in April, 1949 (see Baldwin 1950).

Cook (1910-12, p. 339) admits the existence of many and diverse *varieties* of the cultivated coconut in the Malay region, but maintains that this does not indicate that the species is native there. On the contrary, he believes, a cultivated species would be more stable in its own natural habitat than when spread over alien territories, and the proximity of the wild stock of a species would be likely to hinder rather than encourage the appearance and preservation of mutations among the cultivated representatives. Cook therefore believes that the variety of the domesticated forms in the West Pacific means little against the total absence in the same area of any plants related to the cultivated coconut. He states: "... to insist that the coconut had sprung from the unrelated Malayan or Polynesian palms would be altogether fantastic."

The following seems to summarize the essence of Cook's conclusion (*Ibid.*, p. 304): "If the coconut could be submitted as a new natural object to a specialist familiar with all other known palms, he would without hesitation recognize it as a product of America, since all of the score of related genera, including about three hundred species, are American. With equal confidence the specialist would assign the coconut to South America, because all other species of the genus Cocos are confined to that continent, and he would further locate it in the northwestern portion of South America, because the wild species of Cocos of that region are much more similar to the coconut than are those of the Amazon Valley and eastern Brazil. Thus, from a purely biological standpoint, it is reasonable to suppose that the vigorous and productive coconut palms reported by Humboldt in the interior districts of Venezuela and Colombia may have been growing near the ancestral home of the species."

Cook (1910-12) declares that the coconut grew even in the West Indies at the coming of the Spaniards, and bases his statement on a number of early chronicles. He shows, what Kerchove (1878, p. 147) had pointed out long before him, that Columbus had seen coconut palms in the New World on his voyage of discovery. From the Journal of Columbus' first voyage he quotes the following brief entry, with reference to the earliest European explorations in Cuba: "He (Columbus) went on and found a beach bordering on very sweet water, which was very cold. There was a beautiful meadow, and many very tall palms. They found a large nut of the kind belonging to India, great rats, and enormous crabs." He also gives Oviedo's (1535-48) more detailed description of the coconut, written in 1526, which adds the Isthmus to its early American distribution:[1] "...there is both in the firm land and the Ilandes a certain tree called Cocus, ... These trees are high, and are found in great plenty on the coast of the South Sea, in the province of Cacique Chiman." The coconut itself is described thus: "Being altogether unite as it grows on the tree, it is of greater circumference than the head of a man... they draw a milk thereof, much better and sweeter than is the milk of beasts, ..." Oviedo also says there are natural holes in the 'cocus' which make them altogether resemble the gesture of "monkeys when they cry", and this cry the Indians call 'coca', wherefore Oviedo believed to have found the reason for the name of the nut.[1]

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[1] Arber's translation, p. 225.

Later in the same century better descriptions are to be found of the coconut palm in the West Indies, from which we learn that there are "very many" such palms, that they carry some forty coconuts each, and that they are thirty or forty feet tall. "It is one of the highest and straightest trees that can be seen". (See Cook 1910-12, pp. 283-285.)

Cieza de Leon, who came to America in 1532 and accompanied the first overland expedition through Colombia shortly after the conquest of Peru, describes a site surrounded by great palm trees on a plain in the district of Anzerma, Colombia. He says about the nut of this palm: "... when it is broken with stones, milk flows out, and they even make a kind of cream and butter from it, which they use for lighting lamps. I have seen that which I now relate, and it all comes within my own experience."

Cook (*Ibid.*, p. 276) doubts Sloane's statement, and that of the early chronicler, Martyr, concerning the coconut palm that "many were found naturally in Peru, ..." In Cook's opinion coconuts have never thriven much in Peru, in ancient times *or modern.* This is undoubtedly correct as compared with the more northern sections of South and Central America. Nevertheless, when the crew of the Kon-Tiki expedition provided for the raft voyage, they had no trouble in obtaining from the Indians near Callao on the central coast of Peru, their requirement of 200 coconuts. If Sellergren's analysis (1898, p. 27) of certain vegetable fibers found in prehistoric graves at Ancon, north of Callao, is correct, then these included material plaited from pre-Columbian coconut husk. Wiener (1880, p. 601) too, supported by the botanist André and later quoted by Harms (1922, p. 165), lists the coconut (*Cocos nucifere*) among eleven plants reproduced in ancient Peruvian effigy jars.

On the other hand Cook cites a sixteenth century Portuguese friar who had resided for a lifetime in the jungles of Brazil, and who regarded the coconut as a native cultivated plant, as distinct from the various plants brought in by the Portuguese. Early evidence in support of this was given by one or two other chroniclers from early Brazil.

On the basis of this known aboriginal distribution of the domesticated coconut in the very same area where its related wild genera and species belonged, Cook proceeded to explain the spread of the cultivated form across the prehistoric Pacific between America and Indonesia. The fact that the domesticated form rather than any of the numerous wild relatives had been diffused across the Pacific, convinced him that aboriginal sailors had intentionally brought the nut with them.

We have already seen that Seemann (1865-73, etc.) rejected the theory of voyagers having brought the coconut from Indo-Malay waters *eastwards* across the Pacific. He argued that no colonists from Asia would have carried the coconut palm eastwards without introducing as well the Asiatic art of bleeding the sap from young flower stalks and making alcohol and sugar from it. It is therefore interesting to note the following information presented by Hunger (1920, pp. 4, 73) in his monograph on the growth of coconuts in the Dutch East Indies.[2] He came to the conclusion that the coconut was probably indigenous to America, but that it reached Indonesia at an early date. It was found in Java as early as during the T'ang dynasty (618-906 A. D.), and an old record from that time states: "the juice is collected and made into wine, which is sweet and intoxicating."

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[1] Compare name of red-haired Indians mentioned on p. 329 above.

[2] Cfr. also Blatter, E. (1926): *The Palms of British India and Ceylon.*—Oxford (Mangalore). (Not seen.)

Hypothetical Polynesian visitors to Java in this early period would thus have had ample opportunity of getting acquainted with wine, and spread the use of alcohol with them on their return to Polynesia, whether the coconut was brought east with them from Indonesia or whether the palm had already 'drifted' westwards across the Pacific from aboriginal America.

Small (1929, p. 153) has successfully shown that the early Spaniards brought the Philippine method of making wine to the Indians at the port of Acapulco in Mexico. Acapulco was the Pacific port which the Spaniards used for their sailings to and from the Philippines, and Small shows that the natives of that port now slice off the tips of flowering branches of coconuts and let the sap flow into receptacles through tubes of bamboo, "exactly as is done in the Philippines." Even the name for this fermented sap *tuba*, is the same in Acapulco as in the Philippines. Small concludes that the coconut must have been unknown in America until the Spaniards thus imported it from the Philippines to Acapulco. We have, however, cited historic evidence to the contrary, and may add that the presence of *tuba* in this ancient Spanish port of call goes to show how closely this drink is associated with the coconut in the East Indies *and areas affected from there.* It is therefore the more important to note that the coconut itself—but not the Indonesian custom associated with it—was present in aboriginal Panama, South America, and Polynesia before the Spaniards had bridged the Pacific from the Philippines to Acapulco.

Referring to the discussions concerning the fact that the Polynesians brought the coconut but not the wine, Cook (1910-12, p. 318) says: "The mystery clears only when we are prepared to admit that the original colonists in the Pacific islands were native of the same continent as the coconut palm, so that they could take with them the cultivated plants on which their future existence depended. By keeping close to the practical agricultural facts we avoid the confusion to which De Candolla and Seemann were brought by conflicting theoretical methods of ascertaining the origins of plants. The uses of the coconut have been most highly developed in the Pacific islands because lack of other plants has compelled the inhabitants to depend on it more and more. Necessity has given rise to the multiplicity of uses, but the palm itself had to be brought from the only part of the world where such palms grew—South America."

In view of the current beliefs that the Polynesian islanders had come out of the Malay domain, Hedley, cited by Geoffrey Smith (1909, p. 174), was more inclined to believe that the coconut was originally brought from the west coast of Mexico *by visiting Polynesian mariners.* Copeland (1914, pp. xv, xvi) writes: "The coco-nut was introduced into Polynesia a very long time ago; long in a merely human sense, however, for it is highly probable that its introduction was the act of man, and that it was a deliberate contribution to the resources of the Island World. ... Originating in America, it must have been carried across the Pacific; and there is good linguistic evidence that its spread was in this direction." Ridley (1930), however, and others with him, believed the coconut by itself could have drifted naturally with the current from Central America to Polynesia, and thence to Malaya. The tenability of the latter theory would immediately eliminate the coconut from the list of crop plants which can be relied upon as evidence of early human voyages in any area.

This problem, however, was successfully analysed by Edmondson (1941), who carried out tests with coconuts floating in sea-water under control at Oahu, Hawaii. Muir (1937, p. 25) had at that time shown that he found no evidence of germinating sea-born coconuts on the coasts of South Africa. Edmondson found that most, although not all, of the coconuts he left in water for periods *less* than 91 to 110 days germinated, provided they were planted in *soil* mixed with sand. However, of 11 coconuts planted on beach sand every second one decayed, although none had been at sea more than from 16 to 44 days. Of the specimens which had had contact with the sea for more than 110 days not one developed, even if planted in soil mixed with sand.

Now, the Kon-Tiki raft, travelling from South America to the Tuamotu Islands, arrived within reach of land just within this maximal margin of 91 to 110 days. (Easternmost land sighted after 93 days, landing after 101 days.) The expedition's log shows that about two-thirds of the raft's progress was pure surface speed, caused by the wind pressure on the sail and the bamboo hut. Coconuts and other buoyant material which fell overboard were always quickly outdistanced.[1] A coconut among the waves does not catch the wind. As the husk gradually absorbs water, it settles and makes no more progress than the surrounding ocean in which it floats. The chance of a drifting American coconut hitting an island exists, as bottle mail and other buoyant objects from Peru are common in the Tuamotus. But the chances that a coconut might land, not on a coral barrier or on a wide sandy beach, but further still, in a suitable locality up on the raised island turf, are very much more doubtful. It is quite certain that all this cannot take place within a margin of less than 110 days. And there are other considerations even more important. The Pacific is no mere waste of water. There is life and activity everywhere. The coconut husk and the eyes of the shell are *not* altogether resistant to the absorption of moisture during prolonged submergence, and the pelagic fauna and flora make this still more so. Nothing of an organic nature can reach Polynesia unaltered or unaffected after a surface drift from South America.

Edmondson pointed to a similar experience in his calm water test at Hawaii, when he wrote (*Ibid.*, p. 301): "After long exposure to the sea some coconuts may become heavily fouled by barnacles, bryozoans, serpulid worms, and algae. In experimental specimens the fouling organisms were carefully removed before the coconuts were reweighed. In Pearl Harbour the bivalve mollusk, *Martesia striata*, frequently infested floating coconuts burrowing deeply into the husks."

The coconuts floating in the water between the logs of the Kon-Tiki raft deteriorated through the activity of sea water and micro-organisms, and were always covered with a cluster of small pelagic crabs. The rest of the supply, carried in open reed-baskets on deck, kept in perfect condition and supplied refreshing drinks and welcome provisions until the last day of the journey. A number of the nuts began to sprout vigorously at the very beginning of the voyage, and it can certainly be said that to any aboriginal sea-voyager, however primitive his craft, a supply of coconuts, coupled with fishing carried out en route, might be the ideal provisions.

It is therefore interesting to note that the early Pacific seafarers seem to have been fully aware of the food and water value of coconuts at sea, not only while travelling into the remote ocean, but also on fishing expeditions off the tropical American coast. About five hundred miles west of Panama lies the lonely Cocos Island (map opp. p. 224), which was thus named by the early navigators because of the abundance of coconut palms found growing there. Since the arrival of Europeans, the palms on this island have almost completely disappeared.[1] Cook (1910-12, p. 291), stressing the importance of their abundant pre-European growth, also shows that the explorer Dampier, who never actually visited Cocos Island proper, speaks of an other "island of cocos" nearer the mainland of Colombia. Cook says: "Though Wafer (one time Dampier's first officer) was not a botanist, his account of the coconuts of Cocos Island is too circumstantial to permit us to doubt that coconuts existed in abundance in his day."

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[1] The wind pushed the *Kon-Tiki* out of the quickest section of the ocean current. A drifting coconut would be apt to follow the faster sweep of the current and could therefore accomplish the crossing faster than those lost overboard by us, although never as fast as the wind-driven raft.

Cook quotes Wafer himself: "T'is but a small Island, yet a very pleasant one: For the Middle of the Island is a steep Hill, surrounded all about with a Plain, declining to the Sea. This Plain, and particularly the Valley where you go ashore, is thick set with Coco-nut Trees, which flourish here very finely, it being a rich and fruitful Soil. They grow also on the Skirts of the Hilly Ground in the Middle of the Isle, and scattering in Spots upon the Sides of it, very pleasantly. ... Nor did we spare the Coco-Nuts, eating what we would, and drinking the Milk, and carrying several Hundreds of them on board. Some or other of our Men went ashore every Day: And one day among the rest, being minded to make themselves very merry, they went ashore and cut down a great many Coco-trees; from which they gather'd the Fruit, and drew about 20 Gallons of the Milk. Then they all sat down and drank Healths to the King and Queen, etc."

As Cook logically argues, the coconut growth found in various localities, even in the hilly ground in the middle of the high island, cannot be explained by drifting nuts washed up on a beach; the coconuts must have been planted all about the island on purpose, although Wafer mentions no sign of former habitation. Cook (*Ibid.*, p. 340) says: "The presence of large numbers of coconuts on Cocos Island in the time of Wafer (1685) and their subsequent disappearance should be considered as evidence that the island was formerly inhabited, or at least regularly visited, by the maritime natives of the adjacent mainland." Also (*Ibid.*, p. 293): "Even without a permanent population the coconuts may have been planted and cared for by natives of the mainland for use during fishing expeditions, a plan followed in some localities in the Malay region. The serious disturbances that followed the arrival of the Spaniards in the Panama region would naturally tend to interrupt such visits."[2]

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[1] Although the original inland coconut groves no longer exist on the island, *Cocos nucifera* are still found in small groves at several places near the shore. (Stewart 1912, p. 378.)

[2] There is no record as to when coconuts were first seen by Europeans on the *Pearl Islands* in the Gulf of Panama (see map opp. page 461), but available evidence speaks strongly against introduction by Europeans. Johnston (1949, p. 85), in his botanical survey of uninhabited San Jose Island in this group, observed several old coconut groves (but few young trees and seedlings) in various localities, but especially on the beaches facing the coast of Panama (north and northwest). Unaware of the prehistoric growth of coconuts on the Panama Isthmus, Johnston suggests that nuts drifted ashore after the introduction of the palm in Central America in post-Columbian times. The local coconut groves were not associated with former European home sites on the island, and a natural sea-borne introduction from the nearby mainland is very likely—unless the native pearl-divers, sea-farers, and aboriginal settlers which formerly possessed and frequented the group, had transplanted the useful nut from its prehistoric groves on the adjoining mainland.

Ferdon[1] observed during his researches in coastal Ecuador in 1942, that "coconuts were used as main water supply for sailing canoes leaving Limones, Esmeraldas, etc. for coastal Colombia." This local traffic was not less important in prehistoric times (see further Part VIII), and we may well presume that if the coconuts were thus important to voyagers along the coast, they would be no less useful to local fishermen or explorers who went further out to sea.

Hill (1929, p. 151) however, writes: "Cook also attaches importance to the occurrence of coconut palms on Cocos Island, ... After considering the various suggestions made by Cook, there seems to be nothing against the view, held by De Candolle, that the coconut palms on this island might have been brought there by early Polynesian voyagers. From this island, or more possibly by the landing of some of these early voyagers on the Pacific coast of Central America, they became established on the mainland and were in the course of time carried far and wide."

If we accept the latter view it would mean that the yet unidentified Polynesians had brought the domesticated coconut away from an equally unidentified place of origin somewhere in Asia, and carried it windwards across the Pacific to bring it ashore in the home of all its related genera and species. This may be correct, but if so, we cannot escape from the consequences. If the Polynesians had actually taken interest in the planting of coconuts on Cocos Island, and the other "island of Cocos" nearer the Colombian shore, they must either have had a local settlement or else considered the territory to be within their own sphere of maritime interest. They would not plant their own coconut supply on an island in entirely alien waters to face a return voyage of thousands of miles with a reduced supply. Obviously, the people who planted coconuts on the islands close to the American mainland were the people who had the greatest interest in its presence in that particular locality. If these were the Polynesians, then the borders of Polynesia move right up close to the mainland of tropical America.

The nearest known Polynesian settlement to Cocos Island is the Marquesas group, nearly four thousand miles to the west. Now it so occurs that it was just the natives of the Marquesas group who told Captain Porter that their early forefathers had received the coconut from some place called Utupu, across the ocean to the *east* of them. Porter (1815, Vol. II, p. 139) tried to identify this easterly coconut island:

"The cocoa-nut tree, as I before remarked, was said to have been brought from *Ootoopoo* (*Utupu*) an island which is supposed by the natives to be situated somewhere to the windward of La Magdalena (Fatuhiva). None of our navigators have yet discovered an island of that name, so situated; but in examining the chart of *Tupia*, the native of the island of *Ulitea* who left there with captain Cook on his first voyage, we find nearly in the place assigned by the natives of *Nooaheevah* (Nukuhiva) to *Ootoopoo* an island called *Ootoo. Po*, which signifies night, black, or dark, may be an addition of our islanders or an omission of *Tupia's*; this chart, although not drawn with the accuracy which could be expected from our hydrographers, was, nevertheless, constructed by Sir Joseph Banks under the direction of *Tupia*, and was of great assistance to Cook and other navigators in discovering the islands he has named. ... Of the existence of *Ootoo* or *Ootoopoo* there cannot be a doubt: Tupia received such information from the accounts of other navigators as enabled him to give it a position on his chart nearly fifty years ago, and the position now ascribed to it by Gattanewa (of Nukuhiva), differs little from that of Tupia."

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[1] E. N. Ferdon, letter to the author dated 27th June 1951.

O. F. Cook (1910-1912, p. 294) was the first to suspect a connection between the easterly located Utupu whence the Marquesas islanders claimed to have brought the coconut, and Cocos Island, the nearest outpost of this palm in South American waters.[1] This in fact clearly indicates a Polynesian *importation* of the coconut from the direction of Cocos Island and America rather than to an *exportation* in that direction. We shall later return to another Marquesan legend of this land to the far east, in which its name is directly identifiable with that of the early Fatherland of the Polynesian gods.

An interesting and relevant incident is also pointed out by Rowe (1950), who shows how an early missionary to the Marquesas in 1797 and 1798 wrote that, according to Marquesan tradition, the coconut was brought to them by an early god-man who voyaged the ocean in "a stone canoe". Noticing that the Marquesas islanders use the Polynesian term for "raft", i. e. *pae-pae*, also as a general term for the characteristic *stone construction* on which all their houses stand, Rowe writes: "I had wondered for many years what this could mean, but I see now of course that it was a reference to raft or *Pae-pae*. *Pae-pae* can also mean stone platform: hence the confusion."[2] If the coconut came to the Marquesas from the east, it would in all probability have come on a raft, or *pae-pae* which strongly supports Rowe's interpretation. The first word uttered by the Tuamotu islanders when they saw the Kon-Tiki balsa raft was the same word, *pae-pae*. (Heyerdahl 1948.)

In his discussion of palms and other monocotyledon elements in the Marquesan flora, F. B. H. Brown (1931, p. 120) also supports an ancient east-to-west spread of the coconut palm: "The probable American origin of the coconut is indicated not only in the concentration of species but also in the grouping of related genera." Further corroborative evidence of some significance may be found by observing that the same author examined in Hakaui Valley, Nukuhiva, of the Marquesas, "a few specimens of a remarkable palm discovered and described without name by Henry." Describing this very rare palm, Brown (*Ibid.*, p. 127) found a number of important characters pertaining to it which appeared "definitely to separate this palm from *Cocos* and to place it probably in the genus *Diplothemium*..." All other known species of Diplothemium, five in number, belong to South America and are endemic of Bolivia and Brazil. About the palms in Hakaui Valley, Brown says: "This species is evidently close to *Diplothemium caudescens* from the mountainous regions of South America. It is used by the natives for the same purposes as the coconut. ...The native name in Nukuhiva is *ehi ootahi*."

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[1] He wrote (*Ibid.*): "The accounts which the Peruvians gave to the Spaniards of lands in the Pacific led to the fitting out of the expeditions of Mendaña, Sarmiento, and Quiros. The Polynesians also had traditions of places farther east than any existing islands. The natives of the Marquesas Archipelago, the group that lies nearest to Cocos Island and the Isthmus of Panama, told Captain Porter that the coconut was brought from another island to the eastward. Porter notes the further fact that a native of the Society Islands had given to Captain Cook, fifty years before, a similar name for an island supposed to be located to the eastward of the Marquesas group." St. Johnston (1921, p. 284) also refers to this ancient Marquesan tradition that the coconut had originally been brought from the east.

[2] Personal communication from N. A. Rowe. In letters dated 16th April 1950 and 8th and 18th March 1951, Rowe refers to a manuscript journal by William Pascoe Crook, quoted in Letter XXVIII of *Stewart's Visit to the South Seas*, 1831. We may also note that Stewart (1832, p. 177) himself wrote that the legendary hero who brought the coconut to the Marquesas in a "stone canoe" (*pae-pae?*) was an *atua*. The author stresses in the same connection what we have already seen, that *atua* was the Marquesan term for an ancestral god, but it had a double significance, it was simultaneously the denomination for 'white' men.

Noting that the Marquesans, who face America, remember having received the coconut not from Polynesia but from the far east, we may also observe that there is nothing in Polynesian traditional history to indicate that the coconut was found growing wild locally when the aboriginal Polynesian discoverers arrived. Hawaiian history claims that the coconut was introduced to their islands from *Kahiki* by the two seafaring brothers Ipua and Aukalenuiaiku. (Fornander 1919.) Polynesian settlements west of the Marquesas Group are full of legends and traditions of an early period when there were no coconut-palms on the islands. Some, like the Tahitians, resort to fables or allegories to account for the introduction of the species, but others, like the natives of Manihiki and Rakahanga, state plainly that on their own islands "there were no coconuts, nothing but a bare plain", until visitors from Rarotonga came and planted coconuts which they had carried along. (Gill 1915, p. 146.)

In Melanesia the coconut certainly does not seem to be of very great antiquity, according to native memories and beliefs. Riesenfeld (1950 b), throughout his exhaustive study of Melanesian lore, shows that the coconut is recollected independently in different parts as a food brought to the islands in fairly recent times, often by legendary heroes of "light skin".

Since the last war, Sahni (1946) has raised the claim that some of the petrified palm stems represented in the Tertiary floras of India and Burma, and described as *Palmoxylon sundarem*, belong to the same genus as *Cocos nucifera*. On comparing the form and distribution of the fibro-vascular bundles compared with what he terms the "parenchyma pattern" as seen in cross-sections of the stem, he claims that "a close degree of resemblance can be proved between the modern coconut palm and an early Tertiary *Palmoxylon* from the Deccan Intertrappean Series." (*Ibid.*, p. 371.) I have not seen any comments on this interesting claim by Sahni, and we may assume that the last word in the discussion of the origin of coconut domestication still, apparently, remains to be said.

The latest comment on the subject comes from Sauer (1950, p. 524), who lists the coconut among cultivated fruits and nuts of prehistoric America. He says: "Probably only two palms in the New World were truly domesticated in aboriginal culture, the coconut and pejibaye. The others appear to be unmodified wild species, ..." Stating that we have "adequate and explicit" eyewitness evidence that the coconut palm was already established "in great groves in Panama, Costa Rica, and on Cocos Island" when the first Spaniards arrived, he adds: "It is possible that such groves of coconuts existed as far north as the coast of Jalisco." (On the latitude of Mexico City.) Further: "The earliest known groves in the New World were in part along the coast and in part at some distance inland, but then, as now, apparently always as groves, and not scattered through the native jungle or brush."

Sauer carefully refrains from taking any definite standpoint as to the original source and prehistoric migratory route of the coconut palm, but he plainly tends to the view that the prehistoric distribution of coconuts, at least across great ocean stretches, "is the result of deliberate planting by man". He does not list any botanical evidence for a Polynesian, Indonesian, or other Asiatic origin of the domesticated coconut or its parent genus, possibly because no purely botanic reason has ever been found. Referring instead to O. F. Cook's studies of the original domestication of the coconut palm, which assign the species to an American origin, Sauer (*Ibid.*) says: "These studies are still the most significant contribution to the subject even though the conclusions are not sustained in toto." He then goes on to repeat and summarize in his own words the strong botanical evidence on which Cook's original view was founded, and which indicated that this great cultivated plant had its origin in the interior valleys of the northern Andes rather than among alien species in the Old World:

"This evidence rests on the following: (1) The New World concentration of almost all the species of palms related to the coconut. (2) Cook's hypothesis that the primitive cultigen originated in interior tropical valleys where salt springs impregnated the soil. This condition is frequently met with in the valleys of Colombia, such as the Cauca, where near relatives of the coconut are native. (3) The seed is a remarkable mechanism specialized for germination in climates having a long dry season, rather than for facility in marine distribution. (4) The varietal simplicity of the coconut in the New World, as contrasted with great multiplicity of forms across the Pacific, is explained as showing that 'the greatest and most definite variations of the cultivated plant are much more likely to occur and be preserved outside its natural range, where intermixture with the wild type is prevented'."

Sauer finally says of the opposition to this botanical evidence: "The complete hypothesis of Cook has met with resistance, especially because it requires an ancient skill in navigation and because the coconut has had little significance in American economy, as compared with that of Indonesia."

These arguments are not botanical, and may be met by practical reasoning. We shall soon see that the coastal population of ancient South America, including Pacific Colombia, had a buoyant balsa raft which permitted even an unskilled crew, like that of the Kon-Tiki expedition, to plant sprouting coconuts inside Polynesian territory, whence they could spread westwards, through diffusion by subsequent voyagers and castaways, right across the sea. Nor shall we forget that the economic importance of a plant is not a dependable clue to its geographic origin. The cultivation and demand for tobacco, tomatoes, or the cacao-bean never attained the same universal spread and attention in aboriginal America as it has subsequently acquired in certain parts of the Old World, nor was the west Pacific bread-fruit as important in Indonesia as in Fiji or Tahiti, into which it was subsequently imported.[1] Let us bear in mind that the Malays adopted the coconut palm as a source of an alcoholic beverage, unknown east of their own domain. This would tend strongly to increase its local popularity in Asia, and argue strongly against an eastward transportation of the palm. And for water supply it is of much greater importance on barren coral atolls, as in parts of Polynesia and most of Micronesia, than in the great jungles and river-countries of tropic America.

Until the true origin of the coconut is determined, we can not say more than that the available evidence is sufficient proof that man must have given it a lift at any rate across its largest prehistoric water-space, that between tropic America (with the Cocos Islands) and the Marquesas Group.

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[1] Merrill (1950, p. 8) writes about the Polynesians: "...And of course the breadfruit (*Artocarpus altilis* Fosb.) was a most important food plant to them although it is little used in the islands to the west from whence it came."

The pineapple

Compared with the coconut, the pineapple (*Ananas comosus*, or *Ananas sativus*) played a very limited part indeed in the material culture of the Polynesians. But as a direction-finder in an analysis of early Polynesian voyages and contacts, its value is most apparent, and more dependable than a comparative study of most man-made artifacts.

The original home of the pineapple is well-known to be pre-Columbian America, where a small-fruited, long-leaved form was found growing spontaneously at least from Brazil to the Andean highlands and as far south as Paraguay, while larger, finer forms were found from Jalisco in Mexico to as far south as perhaps the Pacific lowlands of northern Peru. Sauer (1950, p. 526) states that Popenoe recorded an extensive production of aboriginal pineapple up to an altitude of 1 500 m in the Andean valleys of Ecuador. He says: "It may have originated in some northern inter-Andean valley, along with other plants of the kinds cultivated by division." Most writers believe that the pineapple originated somewhere in Brazil, whence it was spread by aboriginal planters to various parts of tropic America.

In his monograph on the genus *Ananas*, Bertoni (1919, p. 280) seems to be one of the first to tentatively indicate that this crop plant seems to have spread westwards from South America and out across the open Pacific in pre-Columbian time. And in his volume on Monocotyledons in the *Flora of Southeastern Polynesia*, F. B. H. Brown (1931, p. 137) directly challenged the accepted view among anthropologists as to Polynesian navigation on the American side of the ocean, arguing that the aboriginal planting of *Ananas sativus* in the Marquesas Group implied an early crossing of the East Pacific by native craft. He says about the local growth of this culture plant:

"A native of tropical America, it is evidently of ancient aboriginal introduction in the Marquesas, where it is to be found in all inhabited valleys. A few plants occur here and there at low altitudes, but it seems to have been planted more commonly in the arid uplands in situations too dry and exposed for other plants belonging to the native agriculture. One of the largest pineapple plantations in the Marquesas is in eastern Fatuhiva, on the dry, rocky, exposed slopes of Mouna Natahu, at an altitude of 900 meters. The xerophytic trees and shrubs originally covering this mountain have been removed. Under such conditions, the pineapple of the Marquesans grows luxuriantly without cultivation of any kind. The long, tangled stems cover the rocks and stones, where few other plants can grow. A few plants occur also along the dry trails, but are absent from undisturbed areas of indigenous vegetation." Brown also writes: "The pineapple was valued in ancient times for its fruits and leaves, the fruits being used more extensively for the *leis* and for scenting coconut oil than for food. However, the various varieties, thriving as they did on the dry interior uplands, were planted along the trails where no streams or springs existed and few or no coconuts thrived. Thus they afforded food and a refreshing source of thirst-quenching juice. ... The native names are *haa hoka* (northern dialect) and *faa hoka* (southern dialect) in the Marquesas, *hara* in the Cook Islands, ..." Further: "The fruit, which is small in comparison with that of commercial varieties, is extremely fragrant and superior in flavor. The following 6 names and cultivated varieties, all of which were an integral part of the ancient material culture, were evidently originated by the Marquesans from the single Brazilian species. This fact seems fairly positive evidence that the early

Polynesians, through contact with America, obtained their original stock long before the discovery of the Marquesas by Europeans." (See Plate LXIII **9**.)

During my own stay in the interior of Omoa Valley, and later in Ouia on the east coast, I was able to get well acquainted with the local native variety of the pineapple. The *fa'a hoka* was never found near the modern villages and settlements, but invariably near former mountain trails or on archæological sites with traces of stone platforms or early native habitat in the long abandoned inland hills of the island. Our native guides would of their own accord proudly point out the favoured places where the inland *fa'a hoka* grew; they assured us that these were remains from their own early forefathers and regarded the vestiges of the ancient pineapple plantations with exactly the same pride as when they pointed out petroglyphs, burial sites, or early masonry in the long deserted parts of the island. Modern food-plants which have been introduced to this and the other Marquesan Islands since European contact have invariably been planted in or near the historically occupied settlements, and in this respect the *fa'a hoka* presents a marked contrast. The mountain Mouna Natahu on the east side of Fatuhiva, where Brown described the richest pineapple growth of the Marquesas, is one of the most isolated and least accessible spots on the island, and according to Tei Tetua (the only surviving native on the east coast in 1937), this mountain represented the last fortified stronghold of the aboriginal tribes who were confined to the hills when the immigrants from *Hawai'i* occupied all the coastal valleys. Exceedingly few Europeans have ever visited Mouna Natahu, and the local *fa'a hokas* were abandoned by native agriculturists long before the better quality of pineapples was introduced to the valley of Taiohae in Nukuhiva at the beginning of the 19th century. (Porter 1815, Vol. II, p. 134.) Although the present natives favour the juicy but acid taste of the wild mountain pineapple, they have never bothered to transplant it from the rarely visited inland sites, and the existence of *fa'a hoka* was always a certain sign of early former habitation or activity.

The origin of the pineapple in Hawaii is also an interesting question. Collins (1949) in his monograph on the pineapple, calls attention to its early growth in Hawaii, and shows that it was known as *hala Kahiki* among the aborigines of that group. This, indeed, is a name not of European deriviation, but closely related to the aboriginal term for the pineapple in the Marquesas group, *fa'a* or *ha'a*, and to that of the Cook Islands, *hara*. (Brown 1931, p. 137.) The suffix *Kahiki* is in our days a term almost equivalent to "abroad", but in all ancient Hawaiian and other East and Central Polynesian myths and traditions *Kahiki* is the main and general name for the earliest continental Fatherland of the Polynesian people. (See further Part X.) It is remarkable that just a South American plant like the pineapple is honoured with this suffix.[1]

Degener (1930, p. 88) states with regards to what we know of the introduction of the pineapple in Hawaii: "According to written records, the first white man to plant the pineapple in the Islands was Don Marin. This was done in 1813, though the Hawaiians had been growing the plant in a semi-wild state long before." It was only a generation earlier that Cook discovered the group, and his party did not narrate to have introduced pineapple cultivation in Hawaii, nor was his itinerary such that he could have been equipped with this American plant. It is important to note that the pineapples introduced by Europeans to Hawaii, and found in the present plantations, are different from the earlier semi-wild native *hala Kahiki*. Degener (*Ibid.*) writes of the latter: "These plants ... produce rather small but very fragrant, sweet fruit. They may be found near sea level usually as escapes from early cultivation by the Hawaiians. They grow in numbers in rocky places on the Island of Hawaii in Puna, ...as well as in Kona, ...they are known from...Wailau Valley, Island of Molokai; on the Island of Kauai; and probably elsewhere."

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[1] In Hawaii as well as the Marquesas, the name for pineapple is also given to certain *Pandanus* species, the syncarpia of which very much recall those of the pineapple. It is therefore the more noteworthy that it is the actual pineapple and not the *Pandanus* which in Hawaii carries the suffix "from Kahiki". In Fiji the name *vandra* usually referred to both the *Pandanus tectorius* and the *Ananas comosus*. (Degener in: Smith 1942, p. 6.) The term *ananas* was adopted by Europeans from the natives in Brazil, from where the first fruits were carried to Europe about 1650.

The fact that the vegitatively produced pineapple was not at all an Indo-Melanesian plant, but could only have come out of America, has, as in the case of the sweet-potato, caused directly biassed theories to account for the navigational problems connected with its original introduction in the islands. Even Degener (*Ibid.*, p. 87) was originally led to conclude with reference to the original Hawaiian pineapple: "That it was introduced by the Hawaiians is inconceivable as that would presuppose considerable Polynesian intercourse with America. The plant was brought here either directly from the tropics of the New World by the white race or from Tahiti or some other region to which it had been previously imported from America by the same people. It is even possible that the pineapple, carried as an antiscorbutic, before Captain Cook's discovery of the Islands, was brought here on a Spanish vessel." Degener refers to Don Pedro Alvarado de Saavadra who left Mexico in 1527 with 3 ships and lost 2 in a storm at sea, but there is no good reason to suspect that the two lost ships ended up in Hawaii, and with the small variety of pineapples on board, which in America were only known to the south of Panama where Saavadra's ships had never been. In a later publication Degener (1949, pp. 194, 195) also willingly admits that there are reasons to believe in pre-Columbian contacts between Polynesia and South America, with the possibility both of Hawaiians visiting South America and of Indians migrating in prehistoric times from South America to East Polynesia.

Christophersen (1935 p. 47) states that the pineapple is common in a natural state in Samoa, but he has no information pertaining to the local introduction of this South American plant.

The question as to how the native varieties of the pineapple reached the aboriginal settlements in parts of Polynesia has still not been adequately answered by the ethnologists, who have given very little attention to this ethnobotanical problem. But Bryan (1935, p. 67), commenting on the hypothetical migratory route from the Malay Islands to Polynesia, writes: "The presence of the pineapple and certain other food plants in Polynesia may mean that they even voyaged to the coast of South and Central America."

The papaya

The papaya (*Carica Papaya*) belongs to a genus *Carica*, native of tropical America, where it was first encountered by the Spaniards in Panama. A larger, finer form of the papaya seems to have had its main centre of domestication in Central America, whence it gradually spread north into Mexico and south into Peru. Other forms are indigenous to South America. Sauer (1950, p. 531) writes: "From northern Colombia to northern Chile there is an interesting and poorly known lot of Highland cultivated species. These are generally reduced in size of trunk, fruit, and leaf, and the majority are often eaten after cooking. Here belongs the *mito* of the Peruvian Andes (*Carica candicans*). A number of species, all of which bear local Indian names, are very common through the Highland settlements of Ecuador and Colombia and well into the tierra fría."

Again F. B. H. Brown, as a leading authority on Marquesan plant life, wrote in his subsequent volume (1935, p. 190) on Dicotyledons in the *Flora of Southeastern Polynesia*: "*Carica Papaya*... At least two varieties are present in the Marquesas: *vi inana* (*vi inata*), recognized by the Marquesans as one of their ancient food plants, is doubtless of aboriginal introduction. Its fruit is smaller and less palatable than the *vi Oahu* which is claimed by the natives to have been introduced from Hawaii by the early missionaries. Both kinds yield abundantly. The native name of the species is *vi inana*, *vi inata*, or *vi Oahu* in the Marquesas; *ita* in Tahiti, *ninita* in Rarotonga; *eita* in Rimatara; and *hei* in Hawaii. The sap of the papaya, preferably that from the male tree (*mamee*), is used as a poultice. A native of tropical America; of aboriginal introduction in Polynesia."

Some other American elements in the Marquesan flora

It may be relevant here to note that Brown himself is not attempting to establish a transfer of *human* beings from America to aboriginal Polynesia. As a botanist, he accepts the current opinion among Pacific ethnologists of a Polynesian immigration from the Old World, and he even argues that this theory is supported by the pre-European presence of the breadfruit and other Old World (Melanesian) food plants in the Marquesas Group. Yet he is led, from observed evidence, to infer that the native flora of Southeast Polynesia evinces American relations, often involving human agency. The necessity of an early American-Polynesian transfer applies not only to such cultivated crops as the gourd, sweet-potato, cotton, coconut, pineapple, papaya, etc., all of which were first domesticated and subsequently brought across the sea by man, but also to a great number of such species as must have reached the islands from America by *natural drifts* from the east long before the arrival of human migrants or drift voyagers with the more tender crop-plants and tubers. This, indeed, is a good criterion of local ocean drifts.

However, among the American elements in the native Marquesan flora there is a noticeable proportion which Brown was led to attribute to a transfer by an early human agency rather than to an independent ocean drift. Thus, whereas the Asiatic sugar-cane, unknown in aboriginal America and on the Micronesian atolls, must have entered Polynesia from Melanesia, like certain other deliberately imported grasses, the similarly imported Marquesan *pavahina* (*Aristida subspicata*) was a South American species. All grasses of earlier pre-human existence, indigenous to the Marquesas, appear to be of American origin. Brown (*Ibid.*, p. 49) therefore writes: "Although it appears that the main stream of Polynesian immigration came from the west, just the opposite direction from which the indigenous flora came, undoubtedly some intercourse may have occurred between the natives of the American continent and those of the Marquesas."

Showing that the *pavahina* has received its native name from that of the peculiar local head-ornament (*pavahina*) made from the yellowish-white beard of old natives (see Plate LXXXIII 1), Brown (*Ibid.*, p. 79) says: "... not infrequently the natives of Nukuhiva wore a yellowish-white tuft of this grass in place of the *pavahina*. ... The presence of this American grass as a dominant element in the prairie of Nukuhiva is of interest. It is not unlikely that it was unintentionally brought in by the early inhabitants, possibly at the same time that the wild pineapple was introduced."

We repeatedly find similar botanical inferences in the same work. Thus *Ageratum conyzoides*, with the Marquesan name *mei roro* or *meie parari*, is a species with its centre in tropical America. Brown (*Ibid.*, p. 336) says: "There seems to be no record of any use of the plant in Rapa, but in the Marquesas the fragrant flowers and foliage were prized for the construction of garlands, for scenting coconut oil, and for medicine. Robert T. Aitken also records its use in Tubuai for scenting coconut oil. Pantropic; of American origin, probably unintentionally introduced by early man in southeastern Polynesia."

The South American element in the Hawaiian flora

Turning next to another isolated island group in eastern Polynesia—Hawaii—we find a somewhat analogous picture. In his *Flora of the Hawaiian Islands* Hillebrand (1888) pointed out the local growth of a number of plants closely related to South American species, and referred to them as an *Andean element* in the flora of Hawaii. Most of these elements are too old to have any bearing on human migration, but they are interesting in showing the trend of the natural ocean drifts in this part of the ocean. Hillebrand shows that the Hawaiian group lies entirely within the domain of the northeasterly ocean current, but speculates as to whether a subsidiary feeder may not also come up from the west coast of South America. He writes (*Ibid.*, p. 14): "This accessory stream may or may not account for the important American element of the Andine regions which is apparent in the Hawaiian flora."

In our discussion of the endemic 26-chromosomed cotton of Hawaii, we have already quoted Hutchinson, Silow, and Stephens (1947) to the effect that the means by which Hawaiian plants reached the islands have been the cause of much controversy, and, suggesting that the linted cotton only reached Hawaii after the establishment of early Peruvian civilization, they refer to endemic species of other Hawaiian plants, of which Skottsberg had stated: "The species may be endemic but are seldom strongly marked, standing close to American species."

Carter (1950, p. 172) points out that if we admit that one American plant was carried to aboriginal Hawaii, why not more? He quotes Fosberg, who in a recent study (1948) of the derivation of the Hawaiian flora, writes: "...of the American element [in Hawaii] a far greater part of the species are only slightly distinct from their American relatives than is true for the other elements." This, of course, indicates that the introduction of the American (Andean) elements is much more recent than that of the other Hawaiian plants, and yet sufficiently ancient to be definitely pre-European. Extracting a selection of nine Hawaiian species[1] from Hillebrand's flora (1888), Carter (*Ibid.*, p. 174) says that the entire list "deserves to be studied from an ethnobotanical point of view."

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[1] Namely: *Portulaca oleracea*; *Hibiscus youngianus*; *Erigeron albidus*; *Physalis peruviana*; *Ipomoea acetosafolia*; *Amaranthus paniculatus*; *Chenopodium sandwichensis*; *Potamogeton pauciflorus*; *Eragrostis mexicana*. It should be added that *Chenopodium*

One remarkable species in this series of American-Hawaiian plants is the husk-tomato, *Physalis peruviana.* Hillebrand (1888, p. 310) calls it naturalized and records the native name as *poha.* It was used by the aborigines in early Hawaii for its edible berries. The husk-tomato is an American crop plant, a native of Mexico, Central America and Peru. Two different types are distinguished (see Sauer 1950, p. 520), one belonging to Mexico and the other, *Physalis peruviana,* principally cultivated by the aborigines of Peru. Among the natives of tropical America this plant is commonly grown and widely marketed for its edible fruits or berries, which keep for several months. The Peruvian species is cultivated northward through aboriginal Colombia. About the aboriginal growth of this plant in Hawaii, Carter (*Ibid.,* p. 173) writes: "*Physalis* is an edible plant related to the American tomato. Jenkins has recently published *The Origin of the Cultivated Tomato.* He considers *Physalis* to be an older plant food than the cultivated tomato and the tomato to have been domesticated because of its general similarity to *Physalis.* Like cotton, sweet potato, and *Hibiscus, Physalis* points again toward Peru."

Reviewing the known native uses of several of the other species of his list from Hillebrand's Hawaiian flora, Carter (*Ibid.*) ends by saying: "Even these few notes from an old botany suggests a clue to the origin of some of the American element in the flora of Hawaii. It would be strange indeed if it should prove that only the 'cosmopolitan weeds' used by man in America were transported by nature to Hawaii and that the same uses found in America travelled with them as in the case for *Argemone.*"

The Argemone

The growth of the strictly American Argemone (*A. alba* var. *glauca*) was already noted in Hawaii by Captain Cook, and has therefore not missed considerable comment in the literature of the subject. Prain (1895), in "An Account of the Genus Argemone", shows that the genus was otherwise restricted to aboriginal America in pre-Columbian times, *Argemone mexicana* having been introduced to Europe in 1592. (*Ibid.,* p. 325.) He admits that the presence of a variety of this American species in prehistoric Polynesia "is difficult to explain", and shows with Hooker that the white-flowered Hawaiian Argemone seems closest associated with a certain white-flowered Argemone of the Pacific coast of Chile. He points out (*Ibid.,* p. 208) that: "Medical qualities have been attributed to *Argemone* in America by the Mexicans, ... The oil of the *Argemone* is said by Dymock to be medical..." We may add here that *Argemone mexicana* was used also in aboriginal Peru for its narcotic and anesthetic properties. (Yacovleff and Herrera 1935, p. 41.)

In his work on the *Papaveraceae,* Fedde (1909) also emphasised the purely American origins of all the *Argemones,* and shows that their spread from an original homeland in Mexico and Central America, down through the Pacific slopes of the Andes as far as Chile, is in all probability due to the work of man rather than nature. He suggests (*Ibid.,* p. 280) that the variety of *Argemone alba* discovered in aboriginal Hawaii may perhaps be a hybrid form between *A. alba* and *A. mexicana,* but admits in any case that this Argemone occur-

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sandwichensis, or *Ch. oahuense* as it is now called, had however existed in Hawaii many millennia before the arrival of man. Selling's pollen analysis (1948, p. 79, etc.) has determined its local growth in dry local districts since the glacial period. For the antiquity and importance of the cultivated amaranths in aboriginal America, see Sauer (1950, p. 497).

rence in Polynesia "is really difficult to explain". Like Prain, Fedde points out that the milky sap and the oily seeds of the Argemone were used for skin diseases and other medical purposes among aboriginal Indians of America, an important piece of ethnological information which may well explain the artificial spread of the plant close to human settlements all the way down the Pacific side of the Andes, and right across the ocean to prehistoric Hawaii.

Stokes (1932, p. 599), in his paper on the problematical spread of the sweet-potato from America to prehistoric Hawaii, said: "Were there an early contact between Hawaii and Central America, it might not be so surprising that the Mexican poppy (*Argemone mexicana*) was found in Hawaii by Cook's people. It might have been ship-borne instead of wind-borne as generally stated."

No botanist would suggest that the Argemone seeds could blow from America to Hawaii, nor would petrels or other fish-eating, long-distance sea-birds help seeds of Argemone to bridge this span of ocean. The only simple and logical explanation is the one suggested by Stokes (also Heyerdahl 1949; Carter 1950; Jakeman 1950), that the plant was carried by man in aboriginal craft. Carter (1950, p. 172) says, in pointing to the fact that the early Americans used the Argemone medicinally:

"These items suggest that we are dealing with no weed, but a plant with culturally determined usages. That the plant and its specific usages travelled together suggests purposeful rather than accidental transport. The question of *Argemone alba* var. *glauca* in Hawaii then assumes a new light. In Hawaii it accompanies the sweet potato, surely an American plant, and 26-chromosomed cotton of probable American origin. It has the same arbitrary medical uses as in America: not only the use of the seed oil, but also the application of the milky sap to chronic skin diseases. The plant was present when Cook discovered the islands. Fedde long ago noted that this plant grew in open places, a characteristic of the introduced plants of the islands as Engler had even earlier noted. Fedde considered it not an ancient introduction. Such evidence certainly suggests that man carried it to Hawaii." And (*Ibid.*, p. 179): "*Argemone* suggests that the exchange of knowledge went beyond food plants into medicine and its associated magic and ritual."

The South American element in Easter Island flora

The early voyagers, as we have already noted, saw that the principal of all food plants in aboriginal Easter Island was the American sweet-potato. In the narrative of the early Spanish expedition from Peru which rediscovered Easter Island after Roggeween, we read (Hervé 1770, p. 123) that besides the sweet-potato the gourd was a local culture element, also "plants like those whose leaves are employed at the Callao [Peru] for making mats."

Skottsberg (1934, p. 278) points out that the flora of Easter Island is "extremely poor in species", and moreover that in several cases there is no certainty whether or not a given species is indigenous. He lists seven species as American elements in the local flora, three of which are endemic to Easter Island and four of which are not.[1] He says: "From a botanical point of view the plants, with the exception of the American species, offer no great difficulties, provided that we can rely upon the actuality of the transoceanic migration. . . .but the presence of an American element is, in any case, surprising."

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[1] Respectively: *Axonopus paschalis; Danthonia paschalis; Dryopteris espinosai;* and: *Cyperus vegetus* (now called *C. Eragrostis*)*; Scirpus riparius* var. *paschalis; Polygonum acuminatum; Lycium sandwicense* (now called *L. carolinianum* var. *sanwicense*). *Cyperus Eragrostis* (*C. vegetus*) which is widely spread in South America is also known in Peru, and is found

This would imply that, provided we can rely—not only upon a thirteenth century influence by the migratory vortex from nuclear Polynesia—but also upon a considerably earlier arrival from pre-Inca Peru, then the American element need not be quite so surprising either.

The American element in the flora of Western Polynesia

Seemann (1865-1873) was the first to take up the question of human agency in the aboriginal spread of weeds into Polynesia. His specific field of botanical research was Fiji, the most easterly outpost of the semi-continental islands of Melanesia which in a way form an extension of Australasia, equally in regard to geography, botany and anthropology. Excluding such aquatic and strand species as could have spread with ocean drifts, Seemann presented a most interesting problem regarding early Fijian weeds, having found, among a total of 64 local species 48 common to Fiji and America, while only 16 were held to be Old World plants. He says (*Ibid.*, p. xvi): ". . . it must be conceded that the bulk of weeds of Viti is of American origin, or, at all events, is now found in America. This is the more singular, as the majority of the species of these islands, as far as they are not endemic, is Asiatic."

Merrill, who has in his various publications (1920; 1930; 1931; 1936; 1937; 1939; 1946) so vigorously opposed the possibility of any aboriginal deep-sea voyages either to or from America in pre-Columbian times, has consistently refuted any opinion to the contrary, including that of Seemann. However, we have seen how he made a specific exception to his own rule regarding the sweet-potato. And suggesting that a portion of the Polynesian weeds might perhaps have been carried out of America by the earliest *European* discoverers, who "in general came into the Pacific from the American side", he admits (1939, p. 637; 1946, p. 339): ". . . yet even as the Polynesians themselves may possibly have introduced the sweet potato from America into Polynesia, at the same time they may also have introduced a

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as far north as California and Washington. (Macbride 1936, p. 270; Kükenthal 1936, p. 179.) Kükenthal (*loc. cit.*) also lists it as naturalized in Tahiti and New Zealand. Cheeseman (1925, p. 215) commented on its New Zealand occurrence: "The true home of this plant, as has been pointed out by Mr. C. B. Clarke is in temperate South America, and there can be no doubt that it exists only as an introduced species in New Zealand, as also in many localities in Southern Europe, the Azores, North America, Tahiti, &c. I retain it in the Flora because it has been twice described as an indigenous species, and on account of the remarkable fact that wherever found it presents all the appearance of a true native, and would certainly be taken as such by any one unacquainted with its origin." The early naturalization of this plant in Easter Island, Tahiti, New Zealand, may in the light of the already accumulated evidence very possibly be due to an early transfer of aboriginal oceanic craft from South America. The Easter Island variety of the *Scirpus riparius* is closely related to the important *totora* reed of the Lake Titicaca basin, *Scirpus tatora.* Macbride (1936, p. 290) refers both to the same species, *S. californicus.* (For native use see Plate LXXX.) Skottsberg (1921, p. 70) also lists this species from Hawaii, but Selling (*viva voce*) informs me that this seems to be an old record by Mann (Böckeler in Linnaea, 36, p. 712) referring to *Scirpus lacustris*, the *akaakai* of the natives. (Hillebrand 1888, p. 475.) *Lycium carolinianum* var. *sanwicense* is a variety of an otherwise American species confined to Easter Island and Hawaii. The slightly salty berries are edible but not very palatable. (Hillebrand 1888, p. 309; Skottsberg 1921, p. 76; Degener 1932, Fam. 318; Hitchcock 1932, p. 243.)

few American weeds." If in fact they had introduced the tender tubers of the sweet-potato and a few American weeds, then the attempt to dam up the Pacific with a fictitious wall between aboriginal America and Oceania has apparently a flaw — and through this flaw other weeds and elements may equally well have passed.

Heliconia bihai

If we suppose that the first aboriginal settlers, just like the first European explorers, came into Polynesia from the American side, then Fiji would be the first area where South American culture people, coming from the east, would encounter man out of Asia. As stated earlier, the *pre*-Maori-Polynesian direct contact between Peru and Melanesia in the rather early centuries A. D. may explain the problems arising from the fact that many culture elements are peculiar to these two marginal areas. One of these may be the pre-Columbian spread of the useful American plant *Heliconia bihai*. Lévi-Strauss (1950, p. 475) shows that the leaves of *Heliconia bihai* were used for roof and wall thatching as well as for the manufacture of containers among aboriginal peoples in South America. Baker (1893, p. 192; and subsequently Schumann and Lauterbach 1901 etc.) shows that this plant was originally native to tropical America, and introduced into cultivation in Europe from the West Indies in 1786. Referring to *Heliconia bihai* as occurring throughout eastern tropical America, he says he cannot clearly separate the Mexican and the Peruvian species, whereas the Pacific Island *Heliconia* appears to him to be only a cultivated form also closely related to this same species.

Here again O. F. Cook (1903, p. 490) put forward the likelihood of human transplantation. He referred to Schumann, who inferred a prehistoric introduction of *Heliconia bihai* from America to the Pacific islands, and said: "In the time of Oviedo (1535-48) the natives of the West Indies made hats, mats, baskets, and thatch from the leaves of Heliconia, and the starchy rootstocks were eaten." And: "Though no longer cultivated by the Polynesians, it has become established in the mountains of Samoa and in many of the more western archipelagoes. In New Caledonia the tough leaves are still woven into hats, but the Pandanus, native in the Malay region, affords a better material for general purposes and has displaced Heliconia in cultivation among the Polynesians."

The yam bean

A similar and probably even wider prehistoric spread has been acquired by an edible tuber, the yam bean, *Pachyrrhizus sp.*, whose large turnip-like roots are edible. Clausen (1944, p. 7) states in his monograph on this plant: "Probably all species were originally indigenous to the mainland of Central America and South America." He speaks of the medical properties of the plant, but adds (*Ibid.*, p. 3): "Historically, and until now, the most important use of *Pachyrrhizus* has been as food. The watery tubers are delicious and sweet. They were probably used in Mexico for centuries before the Spaniards arrived. As early as 1615, Hernandez, according to Altamirano and his associates (1907), commented on the desirable qualities of the tubers, and said that they were carried back to Spain as sugar conserves or fresh and covered with sand."

Clausen (*Ibid.*, p. 29) shows that *Pachyrrhizus tuberosus* "seems to be native in the headwaters of the Amazon River and its tributaries in Brazil, Peru, Ecuador, and Bolivia", and adds (*Ibid.*, p. 31): "In South American countries and certain of the islands of the West Indies, *P. tuberosus* seems to be the common yam bean in cultivation. Studies of seeds and tests of them by Hansberry and Norton indicate that this species possesses the same insecticidal properties as *P. erosus*."

Pachyrrhizus was known among the aboriginal Quechua Indians as *ajipa*, and although it is almost unknown in modern Peru, Sauer (1950, p. 513) shows that it was described by the early chronicler Cobo. Yacovleff and Herrera (1934, p. 283) demonstrate the presence of its roots in the ancient Peruvian graves at Paracas, and show that the plant was also used as a decorative motif in Nazca art. Although it has almost disappeared from Peruvian agriculture, it is still cultivated in the Bolivian *yungas*.

O. F. Cook (1903, pp. 483, 496) again apparently was the first botanist to realize fully that "in time and labor of travel" the Pacific Islands are nearer to the early culture-bearers of Peru than are many of the inland regions conquered from prehistoric Cuzco. This, he suggests, will explain how the edible tuber of such a leguminous vine as this "yam bean" had been carried across the ocean to aboriginal Tonga and Fiji. He says: "The natives of the Tonga Islands no longer cultivate *Pachyrrhizus* for food, but they nevertheless encourage its growth in their fallow clearings in the belief that it renders them the sooner capable of yielding larger crops of yams. ...in the absence of better material, the people of Fiji use the fiber for fish lines, and...the plant sometimes figures in an unexplained manner in their religious ceremonies, an indication of greater importance in ancient times."

Guppy (1906, p. 413) was also struck by the presence of American *Pachyrrhizus* among the natives on the mid-Pacific islands: "Although most of the early food-plants hail from the Old World, the home of *Pachyrrhizus* is in America. One may indeed wonder how a plant with such a history ever reached the Western Pacific. It seems to be generally distributed in this part of the ocean, having been recorded from New Caledonia, the New Hebrides, Fiji, Tonga and Samoa. Although its edible roots are only used in times of scarcity, the plant grows wild all over Fiji, being especially frequent in the 'talasinga' plains. Though I searched diligently, it never presented me with its seed. In Tonga, according to Graeffe the plant is much employed in preparing the land for yam-cultivation..."

With its value as a food staple in early Peruvian agriculture now well established, Cook's original observation, that man would be the only natural agent to spread this edible tuber across the ocean by craft, is recently brought up again as ethnobotanical evidence of trans-Pacific voyaging. (Steward 1949, p. 744; Sauer 1950, p. 513.)

Crop plants from Melanesia

We have in the present part discussed some of the American elements in the Polynesian flora. We have seen, in certain instances, that a number of the cultivated plants, important in aboriginal Polynesian agriculture, *must* have been carried out of prehistoric America on ocean craft, while still other more or less useful elements in the local flora *might* have reached the islands by the very same agency. Botany is here able to supply *ethnology* with a series of independent pieces of evidence, ranging in value from actual proof to mere indication.

Ethnology, in turn, may assist *botany* by pointing out that man must have played a very important part in the origin and distribution of the present island flora. Polynesian traditions are full of references showing that, at the time of the earliest discoveries, and during the subsequent inter-island dispersal with trade and colonization, tubers, cuttings, seeds, nuts, and saplings were carefully carried about in the native craft, and thus spread from island to island, surviving in some cases, in others not, and often being discarded in after years for the sake of more convenient and desirable plants. We have already seen (Part IV) how Hotu Matua and his party, when discovering Easter Island from the east, had to subsist on fish, turtle, and the nuts of a creeping plant found growing along the ground, until their own crop, imported and planted upon arrival, began to yield. Similarly, we recall from the first landings of native discoverers on the east coast of Mangareva: "When Miru and Moa arrived there, this place had no people. Also there were no tall trees from the beach to the foot of the mountain. Bare stood the land." This would again argue that the cocos palm, and perhaps even the hibiscus tree, were imported into Mangareva by its human occupants.

Undoubtedly, an unnecessary bias could be removed from the botanical study of the Pacific island flora if it was made sufficiently clear that the claim that man migrated from east to west into the open oceanic area is only a theory, and that we neither have at the present any valid reason to refute the possibility of prehistoric human sailings from the early agricultural centres of the New World into Polynesia.

We have also seen (Part I) that there is no plant evidence suggesting a Polynesian origin in Indonesia, nor the direct importation of any Indonesian plant into Polynesia. Many Polynesian plants may well have had their source and centre of distribution in Indonesia, and among them such important crop plants as the breadfruit and the sugar-cane. But the Polynesians did not, and could not, acquire these plant products directly from Indonesia. Between Polynesia and Indonesia were four thousand miles of Micronesian ocean, with dry and barren coral atolls that housed none of these exacting plants. As Buck was the first to show, none of these Old World plants reached Polynesia with the Polynesian immigrants; they were all secured in the subsequent period of trade and inter-island contact with fertile Fiji, as was the case with the pig and the fowl.

The breadfruit

Henry (1928, p. 423) has recorded an ancient myth about the local origin of the breadfruit tree, which has so many sensible details connected with it that it may well be the distorted legendary version of how this important Indonesian-Melanesian tree was officially received in the Society Islands. To appreciate the value of this peculiar native account, it is necessary to realize that a discoverer or creator of a certain fruit or culture element was often poetically referred to as the "parent" of that object. It must also be borne in mind that the autocratic rule of the Society Islands' king forbade members of any expeditions to obtain personal benefit from any newly discovered or imported food until the king had had his share. Any violation of this custom would require some credible excuses from the "parent".

The legend begins as follows: "Noho-ari'i was the king. Rua-ta'ata was the parent of the breadfruit. He belonged to Ra'iatea. ... This was very long ago when red clay was used as food." The account here goes on to narrate that there came a time when there was a famine in this land, in the reign of No'o-ari'i, and people were forced to use the red clay as food, and to eat the bitter-backed land crab. Rua-ta'ata and his wife were filled with pity for their starving children, so they took them and carried them up into the mountains to a cave, and there they staid to eat ferns. Rua-ta'ata went away, but his wife remained in the cave with their children. Rua-ta'ata, a man of royal blood, in the meantime became the "parent" of the breadfruit tree. Symbolically the hero of the fruit told his wife that while he had been away "during the night", the breadfruit tree had materialized from his own person, his hands had become the leaves, his body the trunk, and his skull the round breadfruit. He instructed her how to roast it and prepare it. "... the wife knew the meaning of her husband's words; and weeping, she collected the fruit, which she roasted; ... and then she fed her children with breadfruit and ate some herself. But that food was not inaugurated by the king according to the custom among the people; this small family themselves ate the first fruits, although they were related to the king.

"At last one day, the king's servants went up into that valley to catch some eels, shrimps, and o'opu (*Eleotris fusca*), and seeing the core and skins of the breadfruit that the water had carried down, they picked them up and ate the little pieces of breadfruit that remained on them, and exclaimed, 'What very good food this is! Whence does it come? So they went in search of the place of that fruit in the back of the valley, until they reached the little dale, and there they saw the wonderful tree. The woman was near it, and they said to her, 'What is this fruit?' She answered, 'It is *uru* (head, or breadfruit).'[1] 'Where does it come from?' 'Here, from my husband, Rua-ta'ata, who let himself become breadfruit because of his sorrow for me and our children without food.' ... The king's servants picked some ripe breadfruit, with which they loaded the canoe that was used for errands of homage; they blew the trumpet shell to announce the arrival of firstfruits and paddled off to Opoa, the great place where the royal family inaugurated the feast of the firstfruits of the land.

"The King Noho-ari'i found the food very good and ordered his servants to go and take up the tree and transplant it at Opoa and to bring the owners of the tree with them. So they went and brought them to Opoa and planted the tree in the presence of the king. ... Ru-mau-ari'i [Rua-ta'ata's wife] and her children wept for the tree; but it was not long before shoots sprang up from the roots that were broken inland, and they formed a clump of trees which soon brought forth fruit."

This story, which embodies so many characteristics of Polynesian tradition, goes on to tell how roots were wrenched off by different visitors who called from Taha'a, Porapora, etc., and who soon carried the breadfruit home with them as a new food plant, and thus spread it rapidly from one island to the next throughout the Society Group. So much for Tahitian tradition.[2] It is interesting to note how the breadfruit spread from Tahiti to Hawaii.

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[1] The same term *uru* is applied to several types of nuts and fruits in northwestern South America. Cook (1910—12, p. 287) says with Velasco from the northern Andes: "There are more than fifty different species of palms, all with the [native] generic name *chonta*... The fruit, in the language of Peru is called *ruru* and in that of Quito *lulum*, which means egg; accordingly the fruit of any sort of palm is called *chontaruro*."

[2] See also Ellis (1829, Vol I, p. 68) for an abbreviated outline of what is essentially the same story.

Buck (1938 a, p. 255) writes of Hawaiian history between 1100 and 1200 A.D.: "A significant voyage was that of Kaha'i, who sailed to Tahiti and returned with breadfruit which were planted at Kualoa on Oahu."[1]

As with the breadfruit, so also with a number of other Old World food plants. It was inevitable that the most important Melanesian food items which had reached Samoa and Tonga from Fiji should spread in a similar manner from one island to the next, if not before, at any rate in the busy period of inter-island activity that followed the Maori-Polynesian conquest of the inhabited eastern ocean.

The taro

The New Zealand Maori have preserved an historic tradition, showing how their ancestors in *Hawaiki* first became acquainted with the West Pacific *taro*, which, unlike *Kumara* and the gourd, was not originally a Polynesian ancestral food. We are indebted to Hammond (1909, p. 105) for this information, which appears in his paper on "The Taro (*Colocasia Antiquorum*)":

"In Note 37, page 192, Vol. II of the *Journal*, information is asked as to the introduction of the *Taro* into New Zealand; in response thereto, I have gleaned from various members of the Ngarauru and Ngatiruanui tribes the following traditions concerning it: —A great ancestor of the above tribes named Maru, in one of his voyages from Hawaiki, touched at an island called Te Wairuangangana, and there became aware of the *Taro* as an article of food. On his return to Hawaiki, Maru took with him some of the broad leaves of the *Taro*, which, together with his description of the food, so excited the people that they fitted out an expedition to find again the island, Te Wairuangangana, and to secure roots of the plant for cultivation." We are given all the details of the expedition which consisted of two name-given canoes commanded by Rauru and Maihi. From some women on the island they got directions "as to the cultivation of the plant, and the requisite behaviour on their return journey with such valuable food on board. Following these directions, Maihi was enabled to return safely to Hawaiki, and accordingly introduced the *Taro* to that land. The credit of bringing the *Taro* to New Zealand is claimed for Ruauri, the commander of the Mataatua migration."

In the *arum* family the true taro, *Colocasia antiquorum*, reached Polynesia from Melanesia, but the less widely distributed and less important dry land taro, *Xanthosoma atrovirens*, known in Tahiti and the Marquesas as *tarua*, must have come from America, where all species of this genus are at home. The latter does not need to stand in water, but on moist, rich soil. In the ecology of the American aboriginals the place of taro is taken by species of this related *Xanthosoma* genus, according to Sauer (1950, p. 511). He says: "As in the case of taro, the cultivation is usually in moist lowlands. ... In the Peruvian yungas, according to O. F. Cook, the roots are dried and stored."

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[1] Henry (1928, p. 422) found in Tahiti a somewhat similar but less detailed parable indicating a secondary local introduction also of the coconut. A man named Piti-iri discovered the coconut growing from the heads of his children as they were dying of starvation: "...they were the first trees of their kind that ever grew in these islands. From them sprang all the varieties of coconuts, and when Tahiti and Moorea were filled with them, the sea carried away stray ones among all the islands and threw them upon the sandy banks of the atolls and long capes, where they have ever since flourished." (The possible survival of the germinating power of coconuts drifting by sea from one island to its near neighbour has never been doubted.)

The yam

We have stated that the breadfruit, the taro, the sugar-cane, the yam, and the banana are Old World food plants that can only have reached Polynesia from their neighbours in Melanesia. Even this statement may prove to have certain modifications.

As regards the yam, *Dioscorea sp.*, its introduction from Melanesia into Polynesia, rather than from America to Polynesia, may be argued as likely, but not as necessary. The genus *Dioscorea* had acquired a trans-Pacific spread in pre-Columbian times, edible forms being found among the natives from tropic America to Indonesia. Sauer (1950, p. 511) states: "The New World Tropics hold a number of wild species of *Dioscorea*, some with edible tubers. In eastern Brazil, in particular, a number are grown, no information being given as to whether domesticated forms have been developed out of the wild parents. One American Dioscorea, the 'yampee', may be a truly domesticated plant. Its smallish, but reputedly excellent, tubers are rather widely grown in the Atlantic tropics from the Antilles to Brazil."

Carter (1950, p. 165), with Gray and Trumbull, shows that at least three root crops,—the sweet-potato, the yam, and the manioc—"were described from the time of earliest contact with the Caribbean. Although there was occasional confusion between all three, the identity of each is clearly established. Oviedo's account of 1535 contains a passage describing the shape, venation, stem, and the hanging habit of the leaf of the yam, differentiating this plant from the sweet potato, and giving the native name as *ajes*. *Ajes* are described in Navarette's account of Columbus' voyage. . . . Here then is another plant which, like the sweet potato, is propagated vegetatively and hence most unlikely to cross wide seas by wind, drift, birds, or other non-human agencies, but which crossed the ocean in pre-Columbian times. The Caribbean location might suggest an African source for this plant, though there is little evidence that the yam was known in Africa at this time. The recording of the yam in the Caribbean, rather than on the coast of Central America, may be but an accident in history. At the moment we have no insight into the time when the yam was carried into America. It could have been brought by those who carried the sweet potato back into the Pacific."

We thus know that the yam was grown by the American islanders in the Caribbean Sea when first visited by Columbus and other early Spaniards, but we do not know how long the plant had then been there. It may be of some importance to note that wild species of the same genus, and with edible roots, were indigenous to tropic America. Unless there were several landings on the tropical coasts of America before Columbus, it would seem possible that the yam came to the New World together with such Old World crop plants as the gourd and cotton. But if so this would have been very early, since archæology proves that gourd and cotton had reached the American agriculturists in early centuries B. C. At this time Polynesia was uninhabited. Nor does the fact that the yam was a crop plant among the Atlantic tribes on the Caribbean islands about 1500 A. D. favour the hypothesis that the mediæval Polynesians brought it across the sea when 'calling for' the sweet-potato in Peru. If the Polynesians came out of Indonesia, it is very unlikely that they could have reached America in time to spread the yam to the Caribbean islands before Columbus. On the other hand, if the yam spread into the Pacific from the American side, it could theoretically have crossed the entire ocean with the speed of a down-wind drifting craft. Little is known of the antiquity of yam in the West Pacific beyond the fact that it seems definitely to have been pre-European in Java. Laufer (1929, p. 245) thinks that the yam is the plant which Bretschneider found "for the first time described in a Chinese book of the second or third century of our era."

F. B. H. Brown (1931, p. 158) collected aboriginal yam (native name *puahi*) in the Marquesas, and wrote: "The material is not sufficient for accurate determination, but it appears to be near to, if not identical with, *Dioscorea cayenensis* Lamarck, a native of Africa, widely cultivated at an early date in tropical America. ...The subterranean tubers are highly esteemed by the natives for food. ... Very rare in the Marquesas. Only a single specimen was found in Fatuhiva, the southernmost island of the archipelago. Doubtless of early aboriginal introduction, and, if *D. cayenensis*, which it closely resembles, it would further indicate contact with America."

Jakeman (1950, p. 32) lists the yam together with the sweet-potato, cotton, hibiscus, the coconut palm, and the Mexican poppy, as an ethno-botanically related group of plants cultivated in the Pacific island before contact with Europeans: "These, however, probably originated in America and were carried from there to the Islands, since the tradition of agriculture is apparently much older in the New World, and because the main currents of the Pacific run westward from America to the Islands. That most of these plants were not merely carried to the Islands accidentally by the currents but were transported purposely by one or more migrating groups of ancient Americans is proved by the fact that few of them, i.e. those which can live in salt water, could have crossed the ocean without man's aid; ..."

Until we know more about the history and chronology of the yam species respectively in America and the Old World, we can only draw the following conclusion: The yam was widespread in early Melanesia, and might have been diffused to Polynesia together with the breadfruit directly from that area; again, it might have spread to Polynesia along with cotton and other crop plants from the New World. At any rate, it cannot have spread to Polynesia directly from anywhere near China or the Malay islands, as Micronesia lay in between without soil suitable for the cultivation and spread of the yam.

The plantain and banana

It should also be admitted that the history of the plantains and bananas (*Musa paradisiaca*) is rather inadequately known as far as America is concerned. I do not at all mean to argue that the species has reached Polynesia from America rather than from Melanesia, but we are apparently not yet in a position to say with certainty that this crop plant was unknown in pre-Columbian South America.

Sauer (1950, p. 526) says about the early growth of *Musa paradisiaca* in South America: "The species is commonly subdivided into two subspecies, the plantain proper (*normalis*) and the banana (*sapientum*). ... Some, perhaps all, of the bananas were brought from the Old World by the Spaniards and Portuguese. The case is not so clear for the introduction of the plantains." Sauer gives ample reasons for this latter statement. He shows (*Ibid.*, p. 527) that the various early chroniclers in the second half of the 16th century considered the plantain a native crop in America, where it was described as occurring from Jalisco in Mexico to the southern coast of Brazil. We may add as far as Peru is concerned, that Montesinos (ca. 1644, pp. 18, 33) claims to have learnt from the early Inca historicans that dried leaves of the plantain were used in the Andes long before the arrival of the first Europeans. And Sauer (*loc.cit.*, p. 527) writes: "Garcilasso de la Vega, Father Acosta, and Guaman Poma, all three of whom were attempting to distinguish aboriginal from introduced crops, stated that the platano [plantain] was of pre-Conquest cultivation in Perū." At the same time, Sauer says, the plantains are extraordinarily poor volunteers, they are slow and difficult in multiplication, and, in contrast to the bananas, they are little used by the Whites but are *characteristically and intimately* associated with *native* economy. To the natives in the tropical belt of America, the plantain is a widespread food plant second in importance probably only to manioc. Sauer also points out that the New World varieties of plantain differ in part from those of the Old World.

Wittmack (1890, p. 340), in his paper on the crop plants of the ancient Peruvians, and later also Cook (1910-12, pp. 295, 318), had earlier defended the view that Musa species were grown in the New World in pre-Columbian times, but Merrill (1946, p. 300) rejected it. He said: "Cook states that the banana was introduced into America in prehistoric times, but the bulk of the evidence is utterly opposed to this assumption, and the probability is that it was first introduced by the Portuguese via the Cape Verde Islands."

Supporters of the latter theory have tentatively given to Tomas de Berlanga, Bishop of Panama, the credit for introducing the banana species to the aborigines of America. De Berlanga is recorded to have planted some bananas on the island of Domingo in 1516. But, as pointed out by Hagen (1939, p. 33), only twenty-four years later, when Orellana in 1540-41 crossed the South American Andes from the Pacific side and was the first white man to sail down the Amazon to its mouth, he "found plantains all along the reaches of the upper river, which established the rapidity of its spread as little short of miraculous..."

If the plantain was unknown in aboriginal America until it was planted on the island of Domingo in 1516, and yet was plentiful among jungle tribes all along the upper reaches of the Amazon when visited by the first white man twenty-four years later, then native messengers must have carried plantain suckers over enormous stretches of water, mountain, and jungle in less than no time, to give them sufficient time to multiply locally before the first white man came across the Andes. If this is the correct interpretation of the available historic evidence, then it may be listed as a major triumph for the extreme diffusionists in American ethnology. For, as Sauer (1950, p. 527) shows: "The multiplication of the plantains is more difficult than that of a seed-bearing plant. The mature rootstocks need to be dug up, divided, preferably dried for a while, and then replanted. This species is an extraordinarily poor volunteer, and its spread must have been almost entirely by deliberate and rather careful planting."

The roots planted by Father Tomas on the island of Domingo must have been quickly dug up again and transplanted throughout the jungles of Brazil to be able to greet Orellana all along the upper reaches of the Amazon, and his immediate successors sporadically from Pacific Mexico to Atlantic South Brazil.

Obviously the theory that the White man brought the plantain to the aborigines of early

America was due solely to careful attempts to avoid irresponsible conclusions and reckless theories, among which a trans-*oceanic* voyage in prehistoric time would be classed by many observers. In the long run this hypothesis, originating in an attempt to avoid oceanic diffusion, may prove to embody a much wilder theory of the aboriginal capacity for trans-*continental* diffusion.

Against this hypothesis we can also quote Stevenson's (1825) and Prescott's (1847) early references to plantain leaves brought from old Peruvian graves. The latter held (*Ibid.*, p. 147): "It is a mistake to suppose that this plant was not indigenous to South America. The banana-leaf has been frequently found in ancient Peruvian tombs." Wittmack (1890, p. 340) also points to the discoveries of banana or plantain leaves in early Peruvian graves, and adds: "Rochebrune found a fruit, but without seed, and therefore belonging to the cultivated species of *Musa paradisiaca*." This discovery was made by Rochebrune (1879, pp. 346, 348) at Ancon on the Pacific coast of central Peru, and was published in his ethnobotanical survey of the prehistoric plant remains interred in early local tombs. (The discovery was later referred to also in Botanisches Centralblatt, 1880, p. 1633.) Harms (1922, p. 166) likewise lists the plantain, *Musa paradisiaca L.*, in his specific survey of the various plants hitherto identified in aboriginal Peruvian graves.

Sapper (1934, p. 119) shows how divided opinion is as to when the banana was introduced into the New World, and mentions the fact that aborigines from Mexico to South America had their own names for the plant. Again Steward (1949, p. 744) in Vol. V of the *Handbook of South American Indians*, lists the plantain, *Musa paradisiaca*, as pre-Columbian in America, and places it with the sweet-potato, the *Pachyrrhizus*, the gourd, Peruvian cotton, "and perhaps peanuts and coconuts," as crop plants which indicate pre-Columbian diffusion "from one hemisphere to the other".

Until a clearer issue is reached as to the prehistoric distribution of the banana and plantain, it is safest only to list this plant in Polynesia as "probably Melanesian".

There is apparently less of a problem as regards the Tahitian and Marquesan fe'i banana (*Musa fehi*, or *Musa Troglodytarum*). Mac Daniels (1947, p. 50) shows that this plant, found in the Tahitian mountains and the Marquesan valleys, is shared with Fiji and nuclear Melanesia, and that it possibly originated in the Solomon Islands, whence it spread east to Polynesia and west as far as to the nearest Moluccas. (See also Cheesman 1949.) F. B. H. Brown (1931, p. 161) records a native tradition according to which it was brought from Tahiti to the Marquesas.

The trans-Pacific Hibiscus

The case of the hibiscus (*Hibiscus tiliaceus*) is included here merely because the tree, like the coconut palm, has become almost indispensible in Polynesian island culture, and because it has been vividly commented upon in the ethno-botanical literature with bearing upon Polynesian oversea voyages. The hibiscus, as opposed to the hitherto mentioned Polynesian plants, have seeds adapted for natural dissemination by sea, and might therefore have preceeded man in Polynesia. Yet some linguistic and other anthropological considerations have brought it into the limelight of ethno-botany.

In 1918 O. F. and R. C. Cook took up the problem of the hibiscus in a paper called

"The Maho, or Mahagua, as a Trans-Pacific Plant". To some extent it was a sequal to O. F. Cook's earlier hypothesis of the South American origin and trans-Pacific spread of the coconut. The genus *Hibiscus* is best represented in America, but to-day a great number of species grow in most coastal areas of the tropics and subtropics. While admitting that the seed of this plant can, at least for some distance, survive a natural drift by sea, these two authors write (1918, p. 156): "Though many botanists have written of the maho as a cosmopolitan seashore plant, its wide dissemination may be due largely to human agency, as with the coconut palm."

To the Polynesian islanders the *Hibiscus tiliaceus* (several varieties) was of the greatest importance, and some of the most important elements in their material culture were based on the availability of this tree. The young bark, with its strong and flexible bast fibres, was peeled into long narrow strips and used as coarse cordage for tying and binding their houses, boats, and various artifacts, and of finer varieties excellent twisted rope was made for lines, fish-nets, etc. The wood was used for numerous purposes, and it was a stick from this tree which, with one of *tiatia* (*Dodonaea viscosa*), was generally used in the Polynesian friction method of making fire. Young shoots were eaten in time of famine, and were also used medically. A medical extract was also obtained from the flowers. The big leaf blades served as food plates, for wrapping, and for numerous incidental purposes. Brown (1935, p. 174) justifiably describes the hibiscus as "One of the most useful of all the trees cultivated by the early Polynesians."

In the Marquesas and other parts of Polynesia the hibiscus was often definitely cultivated, being transplanted from one locality to another simply by cuttings, thus facilitating access to a tree which was in constant demand among the natives.

O. F. and R. C. Cook (1918, p. 155), referring to the hibiscus by its early American name *maho*, write: "While the coconut and the sweet potato are not known to exist in a truly wild state, the maho is an abundant or even a dominant species in many localities, all the way from Porto Rico and southern Florida to the banks of the Guayaquil River, on the Pacific coast of South America. Although used in the same ways as in the East Indies, for bark cloth and cordage, and for kindling fire, as indicated by Oviedo, Dampier, Sloane, Barrerre, and many later writers, these uses were shared with many other plants, so that no special prominence was attained by the maho."

The same authors give much prominence to the observation that both the uses and the names of this plant were much the same among some of the early American and Polynesian tribes. Thus, in tropical America the tree was known as *maho* or *mahagua*, or some variant of this name, and in Polynesian dialects it was known as *mao*, *mau*, *vau*, *fau*, *hau*, *au*, and as *moanua* in Easter Island.

Their conclusion was (*Ibid.*, p. 169): "The maho, mahagua, or linden hibiscus is one of the economic plants to be taken into accounts in studying the problem of contacts between the inhabitants of tropical America and the Pacific islands, in prehistoric times. Though considered a native of America, the maho appears to have been distributed over the islands and shores of the Pacific and Indian oceans before the arrival of Europeans.

"Readiness of propagation and of transportation by cuttings renders this plant well adapted for cultivation and dissemination by primitive peoples. Although human assistance in transportation does not appear to be so definitely required with the maho as with the sweet potato and other plants that are grown from only cuttings, the names of the maho afford almost as definite indications of human contacts as in the case of *kumara*, a name for sweet potato already known to have been shared by the Pacific Islanders with the Indians of Peru.

"The name *maho* or *mahagua*, with numerous local variants, is widely distributed in tropical America and is closely approximated in many of the Pacific islands in relation either to the plant itself or to its principal uses for fiber, bark cloth, and firemaking. . . . That the primitive Polynesians were in possession of the maho before they became acquainted with similar Asiatic plants may be inferred in view of the indications that Polynesian names of other important cultivated plants—the paper-mulberry (*Papyrius* or *Broussonetia*, the rose of China (*Hibiscus rosa sinensis*), and the screwpine (*Pandanus*)—were derived from names of the maho. The making of fire by friction of wood, and of cloth by beating the bark of trees with grooved mallets, are specialized arts which may have been carried with the maho from America across the tropical regions of the Old World. A plant that enabled primitive man to kindle fire and tie things together must be held to have contributed much to the arts of civilization."

Two years later, this theory, too, was opposed by Merrill (1920). He admitted that the *Hibiscus tiliaceus* had attained a trans-Pacific distribution in prehistoric times, but held that the plant had obtained a natural pantropic distribution solely by the agency of ocean currents. He said (*Ibid.*, p. 195): "As a matter of fact, outside of Polynesia the species is never cultivated in the tropics of the Old World... In tropical Asia and Malaya the plant is not of sufficiently great economic importance to warrant its cultivation, and in these vast regions it is certainly not a species that has purposely been disseminated by man, in either prehistoric or historic times. . . . The reasons for its cultivation on some Polynesian islands were undoubtedly that it was the best, or one of the best, of the few fiber plants available to the primitive Polynesians, and that the number of plants growing naturally along the strand was not sufficient to supply the demands for fibers for all purposes. *Hibiscus tiliaceus* was never domesticated or even semi-domesticated in tropical America and in the Indo-Malayan region, for the reason that plants producing better fibers were available in both regions. I maintain on purely botanical evidence that *Hibiscus tiliaceus* is a species of natural pantropic distribution; that it grows in practically all tropical countries along the seashore, its natural habitat; and that it has been disseminated in ages past by ocean currents. . . . Even in Polynesia it is exceedingly doubtful if the Polynesians transmitted this species from island to island, it being far more probable that they purposely propagated it inland from the native seacoast stock on the various islands."

He further wrote: "That a limited inter-communication between Polynesia and tropical America did exist in prehistoric times is entirely probable, but to argue that the present distribution of *Hibiscus tiliaceus* supports this theory certainly does not strengthen the probability. The generally accepted theory among ethnologists supports an *eastward* culture movement across the Pacific rather than a *westward* one. If the Cook *maho* series is related to the Polynesian *mao* series it would be much more reasonable to view it as coming from the Pacific to America rather than as evincing a migration from America into the Pacific."

Merrill admits that Cook presents many data to illustrate the similarity of aboriginal names for the tree in America and Polynesia, but he complains that Cook does not bring

Fiji, Guam and the Philippines into the same series. To meet Cook's thirteen pages of linguistic arguments on the *maho-mao* analogy, Merrill (*Ibid.*, p. 196) musters 40 names for hibiscus in the Malay Archipelago, and selects *balibago* and *malabago* as the ones most commonly and widely used. He writes: "It seems to me to be entirely probable that the original form or root in the Indo-Malayan region was some word like *bago* or *baru*. . . . The probabilities are very great that the Polynesians in their migration, having adopted the name while in the Indo-Malayan region, merely applied it to the wild plant which they found all over Polynesia. It would seem, therefore, that this root has nothing to do with the tropical American *maho* series, the resemblances being merely accidental. The *bago* origin of the *mao* series is a great deal more likely than the *maho* origin, and infinitely more probable in view of the generally accepted theories as to the origin and migrations of the Polynesians."

Here the botanical discussion stranded on an unproven but widely disseminated ethnological doctrine. Only in 1950, by Carter and Jakeman, was the hibiscus again brought into ethno-botanical literature as a possible argument for human migrations from early America into the Pacific. Carter (1950, p. 164) writes about Cook's original proposal: "Cook was wedded to the idea that agriculture began in America and spread thence across the Pacific to Asia. Quite naturally, therefore, he concluded that man had carried the *Hibiscus*, also. The identity of names and usages in parallel to the sweet potato were convincing to him, and, one would think, to anyone. However, the mental climate was then even less receptive to ideas of early trans-Pacific contacts with America than it is now. A challenge to Cook's ideas was bound to be made. Merrill took up the cudgels almost at once."

Reviewing briefly the opinions of the two botanists, Carter continues: "These arguments seem to me to be excellent specimens of the result of fixed ideas. Cook was so intent on proving the American origin of agriculture that he was incautious, if not unwise, in using a halophytic plant with a seed well adapted to water transportation as *proof* of man's carrying plants across the ocean. Merrill on the other hand was either so incensed by Cook's special pleading or so allergic to trans-Pacific contacts (or both) that the violence of his reaction blinded him to the virtues of Cook's arguments. . . . Merrill pointed to seed qualities as invalidating the argument for the *necessity* of man carrying the plant, but did not realize that this did not amount to showing that man did *not* carry the plant. Winds and currents suggest that if the plant was carried across the Pacific by natural means it must have been from America to Polynesia. But natural carriage would leave the problem of usages and name to be solved. To argue, as Merrill did, that the name in Polynesia was derivable from a generic term for bast while ignoring evidence suggesting the same thing in America is weak indeed. To ignore the parallel of hibiscus to the sweet potato is only understandable from a history of ideas standpoint. The identity of names and uses in Polynesia and America, when coupled with the positive evidence from the sweet potato, makes it certain that whether or not the plant crossed the seas by natural means, man carried the name for the plant and quite possibly the usages across the same seas. It even seems probable that he carried the plant also."

Carter's own conclusion is (*Ibid.*, pp. 179, 181): "That the sweet potato and the hibiscus were known in Polynesia and America by the same names speaks of intimate contacts." Also: "Clearer proof for contact between peoples from the Pacific with the peoples of

Middle America could hardly be asked than that supplied by the sweet potato and by the hibiscus known as maho."

How far is American agriculture autochtonous?

The interplay between certain aspects of botany and ethnology has been very interesting. Like aboriginal American cultures, aboriginal American culture plants also have been treated as an entirely seclusive subject matter, as something which, until the advent of Columbus and written history, could only have developed on local soil, without any possibility of influence from outside, on account of the great ocean barriers on both coasts, regarded as obstacles to any human stock but the mediæval European. This view is exemplified by Merrill's statement (1937, p. 282): "As agriculture in America was autochtonous, we may assume that so were the cultures based upon it." This argument, however, has no less frequently been reversed to prove just why American agriculture must have been autochtonous.

The recent discoveries of the archæological gourd and cotton have made such conclusions obsolete, and former opinions concerning a number of highly important culture plants are at present being reconsidered. The bean, *Phaseolus sp.* is a rather illustrative example of the above. As early as last century Körnicke (1885, p. 136), in a paper on the home of the garden bean *Phaseolus vulgaris*, pointed out that this crop plant was formerly generally accepted as having been cultivated in Europe by the ancient Greeks and Romans, under the names of Dolichos, Phaseolos, etc. The cultivation of the same bean among the aborigines of America was therefore explained as the results of its post-Columbian introduction from the Old World by the early Spaniards. This was the theory until Wittmack (1880 a) discovered beans among the archæological excavations of Reiss and Stübel at the prehistoric cemetery of Ancon, Peru. The common garden bean, *Phaseolus vulgaris*, as well as varieties of the Lima bean, *Phaseolus lunatus*, were there found interred as food with mummy burials long antedating the European discovery of America. (Wittmack 1880 a, p. 176; 1886; 1888.)

Here was suddenly ample proof of the pre-European cultivation of *Phaseolus* species in America. At this time, however, pre-Columbian specimens of the *European* bean were no longer accessible; the view was taken, therefore, (Wittmack 1886; 1888; etc.) that the Old World *Phaseolus* must after all have originated in aboriginal America, and been carried *back* thence to Europe by the early Spaniards. Körnicke (1885, p. 136), however, says that Aëtius describes what is probably the same bean at the beginning of the 6th century A. D., and Theophrast as early as 300 B. C. Aristophanes and Hippokrates write about the bean at about 400 B. C., the former referring to it as *Phaselos*.

Since the revolutionary discovery regarding the prehistoric diffusion of the cultivated cotton species, there has been a strong and rapidly growing tendency among modern botanists to re-examine and revise the often loosely founded dogmas connected with certain of the most important early American crop plants. Thus the early Spaniards are today no longer accepted as having brought the *Phaseolus* beans one way or the other across the ocean.[1] Hutchinson, Silow and Stephens (1947, p. 138) pointed out, with the gradually accumulating botanical evidence, that the *Phaseolus* beans represented but one more indication of contact between the Old and the New World before Columbus, and quite recently Sauer (1950, p. 502) has strengthened this evidence considerably. With Mackie, Bukasov, and Ditmers *et al.* he emphasizes that truly wild Lima beans (*Phaseolus lunatus*) have been reported from Guatemala. This appears to be its primary centre of domestication, whence it was carried as a crop plant to remote parts, including Carib, Hopi and Inca territories. According to archæology this must have happened in early pre-Inca times, since this *Phaseolus* species was extremely important to the culture-bearers of coastal Peru from the Early Chimu area to Paracas and Early Nazca. It is found archæologically not only as a food, but as an extremely common decorative and symbolic motif in the art of the local high-cultures. Sauer points to certain curious problems attached to the cyanide content of primitive races of this cultivated Lima bean, and shows that this and other peculiarities recur in parts of Indonesia and Indo-China where also "a race of lima beans of primitive characteristics has long been in native cultivation." He says: "A genetic basis of the glucoside is probable and possibly rests on a number of genes that became suppressed outside of the Caribbean and Southeast Asia by deliberate selection. If, then, southeastern Asia should prove to be a reservoir of the more primitive lima beans, long since extinct in Peru and México, a further problem of the time and manner of trans-Pacific connection is raised by which the American bean was communicated to the native population across the Pacific."

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[1] Se also Carter (1951 b).

The fact that the Lima bean, *Phaseolus lunatus*, has its original wild habitat and first centre of domestication in Guatemala, the absence of the bean in Polynesia, the fact that the primitive Indonesian forms stand nearest to the Carib or Mexican race, and, finally, the marine-geographic observation that Indonesia and Indo-China is a natural recipient of Mexican voyagers rather than vice versa, all combine to suggest a westward diffusion route for this New World culture crop. We may again draw an historic parallel with the recorded voyages of the early Spaniards, and ask:—Could it be that the same prevailing winds and currents caused the earliest people who established aboriginal high-cultures from Mexico to Peru to enter the Pacific along the same routes as followed by the subsequently arriving Spaniards? This would mean that their Pacific navigation began by spreading coastwise down from Middle America to Peru, while some craft which were sent out or lost off Mexico ended up in the islands or continental shores of Southeast Asia, while others subsequently, upon the establishment of daughter-cultures also in Peru, set out with the local off-shore winds and currents and thus ended up in Polynesia. From a purely practical point of view this is certainly no wild idea, but one that is strongly suggested by the natural geographical layout in the Pacific, coupled with the *non-diffusionist* idea that identical environmental factors are likely to cause history to repeat itself through the sameness of the human mind.

A related problem is raised by a related bean, the jackbean, or swordbean, *Canavalia* sp. Stonor and Anderson (1949, p. 392) have recently called attention to the following: "The sword bean (*Canavalia*), widely cultivated throughout the Pacific and always considered to be of Old World origin, is now known from prehistoric sites along the coasts of both South America and Mexico."

Beans from between 3000 and 1000 B. C. "of at least three varieties", all possibly

Canavalia, were recently found by Bird in his pre-ceramic, pre-maize debris at Huaca Prieta, Peru, where the desert conditions are so ideally adapted for the preservation of fragments from the American past. (Whitaker and Bird 1949, p. 2.) Sauer (1950, p. 499) points out that the Old and New World *Canavalia* beans are so alike that there is disagreement as to whether they are not all one and the same species. He says: "The morphologic distinctions are minor and have not been tested genetically. One of the points of difference usually brought out is that the seed color of the New World jackbean is white, and that of the Old World brown, pinkish, spotted, etc. However, the graves of Coastal Peru yield numerous lots of colored and spotted jackbeans. ... Its archæological distribution and relation to wild species indicate the jackbean as a New World domesticate. Future studies may determine whether the Old World forms are derivative from the New World stock."

The absence of maize in Polynesia

Maize (*Zea mays*) was the principal and most typical American crop plant common to nearly all the aboriginal cultures before the arrival of the Europeans, in a vast continuous belt from north of Mexico to south of Peru. Maize was never found among any of the aboriginal tribes in Polynesia. Opinions on these points have been unanimous, and so strongly emphasized that the complete absence of this American corn crop from the Pacific island world has been looked upon as a decisive argument against any diffusion from South America to Polynesia in prehistoric vessels.

More recently some botanists have suggested that, after all, maize may perhaps not have originated in America, since they found reason to suspect that it occurred in the Old World also before the time of Columbus. The question was immediately raised, whether it was possible that the Polynesians or some local predecessors might have carried the maize or its forerunner across the Pacific from Asia to the New World.

We are not very logical if we think that Asiatic maize could achieve what American maize could not—namely, disappear from Polynesia and all the other Pacific islands without leaving the slightest trace of a former local existence. How can we possibly defend our reasoning if we argue that man cannot have voyaged from South America to the down-wind islands in the Pacific because no maize is found in Polynesia; and yet turn to distant Asia and say that early America got its maize from there through diffusion across the Pacific with the aid of the mid-Pacific islanders?

The question as to whether America or the Old World had first domesticated *Zea mays* is indeed not new. Wittmack (1880 b) shows that, as early as 1836, Bonafous claimed that maize was cultivated in the Orient from China to Egypt before the discovery of America. About the same time Sturtevant (1879), in a paper on "Indian Corn", made a careful study of the existing literature concerning that specific crop plant, and found that the large number of botanists who had expressed opinions on the subject was equally divided for and against an Old World origin of maize. However, the prehistoric existence of cultivated maize in the New World was generally recognized, and an origin of the plant in that hemisphere did also gradually gain almost universal support among modern botanists. Only of quite recent years has the old question been revived to create new unrest among botanists, on the ground of newly examined evidence. In the meantime, maize had established itself among ethnologists as the classical argument for the independent evolution of plant domestication and cultural growth in pre-Columbian America.

Stonor and Anderson, after extensive independent research into the specific problems connected with the genetic origin and spread of *Zea mays* (see also Anderson and Cutler 1942), published jointly in 1949 their work *Maize among the Hill Peoples of Assam.* They say (*Ibid.*, p. 355):

"Maize is widely grown in the Orient and is used there for a variety of purposes. Authorities once quite commonly believed that it originated there, but the demonstration that it was almost universal in the New World in pre-Columbian times made an American origin seem most likely. From a meticulous investigation of the historical evidence Laufer (1907 b) concluded that maize did not reach the Orient until post-Columbian times, and Merrill (1931, 1946) produced convincing evidence that maize and other New World crops had been carried to the Philippines at an early date by the Spaniards and had been widely spread on the continent of Asia. The subject seemed closed and the lack of any evidence for pre-Columbian maize in the Orient became one of the most powerful arguments against any effective trans-Pacific communication in pre-Columbian times.

"Several years ago the two authors of this paper came independently to the conclusion that the subject needed to be reopened and examined on its own merits."

Stonor and Anderson's study reveals several significant facts. They found it possible to separate three major races of maize, referred to for convenience as A, B, and C. All three races appeared to occur in America, but only A and C in Asia.

They found that race C must have been brought to Asia in post-Columbian times, as held by Merrill. In Asia it was restricted to the coastal areas, and it also proved to be essentially a Caribbean type of maize, probably carried by the early Spaniards from Mexico to the Philippines and many of the countries actively colonized by the Europeans. (*Ibid.*, pp. 355, 390, etc.)

The only factor then left to be accounted for was the common occurrence in Asia and America of the race A maize. Race A was the smallest, less productive and most primitive of the three races.[1] Stonor and Anderson (*Ibid.*, p. 390) say:

"It seems more likely that there have been at least two major movements of maize in Asia. The latter [race C] in early post-Columbian times... Back in the hills, however, are much more primitive types, unaggressive, not particularly productive, grown by conservative people. If one asks why they did not spread more the answer is that they did spread in Asia from Persia to Sumatra and New Guinea, which is virtually as far as the Asiatic *Sorghum* (which was their companion crop) has been carried." Also: "Furthermore, when we examine the maize of these people it is not the dominant world crop of Central and North America. It is relatively unproductive and with less vigor than other known types of maize. To believe that in post-Columbian times maize could have penetrated not only the Naga but to the hill tribes of Upper Burma, and of Siam, to the Lolo in Central Asia, to the aborigines of Hainan, to the hill peoples of Sikkim, and to the interior of New Guinea, in each case passing over the more civilized peoples along the coast is beyond credulity. To have these conservative people somehow learning to use maize as a popcorn and as a green corn and as a cereal for brewing, to have them growing types of maize which are similar to each other yet rare or unknown in the New World puts the burden of proof on any one who would ascribe all this development to separate post-Columbian acquisitions." Further (p. 391): "If we therefore remove C from consideration, the problem to be solved is how could race A get to a number of isolated hill areas in Asia without anywhere leaving a very definite record along the coast of Asia?"

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[1] Stonor and Anderson (*Ibid.*, p. 391) say: "Though these races may intermingle, each has its own core of correlated tendencies: Race A, archæological and Asiatic—small ears, large glumes, subspherical seeds, short internodes, drooping and included tassel, green plant color;..."

Stressing that: "It would be of primary significance to know where it is most closely approached in the New World", the authors, after a careful analysis, give the following answer: "This complex of characters is unknown in Mexico and Central America. In South America it is approached only in mixtures from the eastern rivers and in certain primitive popcorns. In prehistoric times, varieties with similar cobs and kernels were the only type of maize along the west coast of South America for a very long period." (*Ibid.*, pp. 386, 394.)

Stonor and Anderson further discovered that in western South America the dry, almost completely rainless desert climate has left extensive archæological evidence, some of it stratigraphic, which gives us a better opportunity of analysing early forms than in most other parts of the New World. Here archæology allowed them to establish a sequence of maize types from A, found in the earliest layers, to B, the large-seeded and frequently large-cobbed type appearing in later Inca and European times (p. 391). They say about the local type A: "This type, uniform in the lower archæological levels, became gradually more variable and was supplanted by large-kernelled types similar to modern Andean maize, when the Incas extended their influence down to the coast in times preceding the Inca domination."

In other words, it was discovered that the aboriginal maize of the most isolated and conservative peoples of Asia appeared to find its nearest American relatives at the bottom levels of archæologically preserved specimens in Peru. The crop plant, *Zea mays*, unidentifiable with wild plant species in any continent, must, if this be correct, have travelled with aboriginal agriculturists one way or another at a very early period, before the sailings of Columbus and even before the termination of the pre-Inca era.

The ethno-botanical essence of Stonor and Anderson's study, as emphasized by the two authors (*Ibid.*, pp. 356, 395), is that the most primitive of the three major races of maize was present among aboriginal peoples both in the Old and the New World before the European discovery of America. They say: "Presumably it must either have originated in Asia or have been taken there in pre-Columbian times." They add: "The direction (or directions) in which it travelled, however, is still uncertain. This new evidence, in other words, tells us little or nothing about the origin of maize."

Stonor and Anderson's work has received a wide but not unanimous support. Merrill (1950), as could be expected, vigorously denounces the validity of their conclusions, and declares that he maintains his former view on the subject. Mangelsdorf and Oliver (1951) follow him in their paper "Whence came maize to Asia?". They argue with Weatherwax that maize seems to show nearer affinities to the American Maydeae than to its Asiatic relatives, and maintain that the "unusual" characters of Assam maize, although not common, are shared with sporadic American varieties. They also insist (p. 275) that the absence of the primitive Race A maize "among the very limited collections so far made from the coastal regions of Asia" is in itself no conclusive proof that it does not occur in these coastal regions too, although less frequently than in the inland hills; and that, at any rate, these "non-vigorous and unproductive varieties of Race A, earlier introduced," naturally would be replaced, first along the coast and later in the inland hills, by the subsequently introduced and more productive Race C. In their opinion, however, Race A and C can both have reached Asia *after* the Spanish discovery of America. They suggest that both races can have been introduced successively by post-Columbian voyagers (presumably from Mexico to the Philippines); but, apparently realizing that historic evidence can be mustered against this proposal, they choose to add (p. 276): "A second possible answer, probably the correct one, was given, forty years before the question was raised, by Laufer... This does not mean that Laufer's conclusions on the introduction of maize into Asia are necessarily completely correct and final. However, until new evidence in conflict with them is brought forward, they furnish a satisfactory explanation of the facts now at our command."

This revival of Laufer's 1907 suggestion is interesting. Laufer, in his paper on "The Introduction of Maize into Eastern Asia", presented one much quoted theory and several important facts. His *theory* (1907, p. 224) was: "I shall try to demonstrate that maize, introduced into India probably by the Portuguese, spread northward to Sikhim, Bhutan, and Thibet, finally from there into Ssech'uan, the province of western China bordering on Tibet, and then from the west into the other parts of China, without any interference of European nations, like Spaniards or Portuguese."

The *facts* he presented were old written records which proved maize to be a widely cultivated crop plant in China and the interior of Asia at least as early as in the first half of the sixteenth century.

Referring first to Mayers' early study of "Maize in China" (1867), Laufer (*loc. cit.*, p. 231) states that this author "denied point-blank the possibility of its having been brought to China by the Portuguese, and he did so justly, since there is no evidence for such a statement."[1] Laufer then proceeds (p. 232) to quote an early Chinese writer who wrote as early as in the middle of the sixteenth century:

"Maize (*yü mai*, 'imperial wheat') is produced in Tibet (*Hsi fan*). Its former name is 'Tibetan wheat' (*Fan mai*). Since it was formerly brought as tribute to the court, it received for this reason the name 'imperial wheat' (*yü mai*)." Corroborative evidence is shown from other early Chinese writings, which made Laufer (p. 234) emphasize that: "We have thus brought together three direct literary evidences for the derivation of Chinese maize from Tibet."

He now examines the early European sources (*Ibid.*, p. 235): "... one is the Augustinian monk *I. Gonzalez de Mendoza*, in his 'History of the Great and Mighty Kingdom of China,' which, written in Spanish, appeared in Rome in 1585. He informs us in his book that the Chinese—besides wheat, barley, millet—cultivate also the same *maize* which constitutes the principal food, of the Indians of Mexico. As Mendoza's work is made up from the reports of some friars of his order,—chiefly Martin de Herrada, who had visited the port of Ch'üan chou fu, Fuhkien Province, in 1577, for three months,—we are led to assume that in that year maize was an object of cultivation in Fuhkien, and that it must have been brought there before that time. This date is very important, since it . . . allows us to conclude that maize, after having traversed China from west to east, had reached her easternmost parts by 1560, or at least 1570. . . . but there is another still more interesting passage to be found in his reports. In Chapter 3 of Book III, in which he treats of the taxes in kind which the Emperor of China derives from his province, he states that 'of wheat called Mayz, twentie millions two hundred and fifty hanegs'[1] are obtained. This seems to represent an enormous quantity, especially if we compare with it the other items given by him: of millet, 24 millions of hanegs; of panizo, 14 200 000; of wheat, 33 120 200 hanegs, etc." Showing that these statistical measures must necessarily be very approximate, Laufer adds: "At all events, it cannot fail to show that a most extensive cultivation of maize was then [in 1577] carried on in China,—a cultivation of such dimensions as to forcibly lead to the presumption that it must have been in progress at least for the period of a generation; that is, since about 1540." The essence of Laufer's investigation of the early literature are the following historical facts (*Ibid.*, pp. 239-241): "There is no historical evidence to show that maize was brought to China by way of the sea, either by Spanish or Portuguese, or by Chinese mariners themselves. It is impossible to presume that maize came to China from the Philippines; for when Martino de Herrada made his trip from Zuzon to China in 1577, he found the plant already cultivated there to a large extent, and this was at a time when the Spaniards had just commenced to take a footing in the Philippines and to settle at Manila. It was only in 1571 that the Spaniards and Chinese met for the first time, at Mindoro, before Legazpi, the conqueror of the islands, undertook his expedition to Manila. It cannot, therefore, have been the Spaniards who brought maize to China. On the contrary, maize must have been in China long before it was planted in the Philippines; . . . The introduction of the potato and of tobacco took place at a period posterior to that of maize; and these are recorded in Chinese literature as having taken their origin from the Philippines, whereas nothing to this effect is stated regarding Indian-corn." And: "While, with regard to the American potato and tobacco, the Chinese are well aware of their foreign origin, concerning maize they are still ignorant of this fact, and look upon it as a domestic cereal."

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[1] Before Laufer, Mayers' study of 1867 had shown with ancient Chinese sources that maize was not introduced to that part of the world by Europeans, but that its seeds "came from the lands beyond the Western Frontiers", i.e. from Asiatic inland peoples.

The chief results of Laufer's research were (*Ibid.*, p. 250): "(I) No share is due either to Portuguese or to Spaniards in connection with the introduction of maize into China, and probably, also into Further India and other parts of Eastern Asia. . . . (2) Maize did not reach China from the seacoast, but came overland from Tibet . . ."

Laufer admits (*Ibid.*, p. 241): "I am unable to say when and by whom maize was introduced into India", and he suggests that the possibility of a local introduction by the *Arabs* should be investigated, "instead of repeating the hackneyed phrase, unaccompanied by any documentary evidence, that it is due to the Portuguese". Further (*Ibid.*, p. 245): "A great centre of maize-cultivation is found in Upper Burma, which appears as the natural continuance of that in northern India and Yünnan, accomplished prior to the advent of Europeans in these regions."

If we try to consolidate known historic evidence, keeping facts from theories, we possess the following information. In 1577 maize showed no signs of being a curiosity or novelty in Chinese agriculture, but was like other grains a main contribution in the regular taxes to the Chinese Emperor. About 1550 Chinese writings state that it was "*formerly*" brought as tribute to the court, wherefore it had received the name "imperial wheat". Before that again, it was pointed out, maize had been known as "Tibetan wheat", because it was produced in Tibet. No matter how we look at this information, maize must have been cultivated in China at least as early as in the first decades of the sixteenth century, and before that it was established as a product of Tibet.

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[1] "From Spanish *fanega*, on an average equal to an English bushel and three fifths." (*Ibid.*)

Now, there seems to be no evidence that American maize was brought as a crop plant to any agriculturists in Europe before about 1530-50. If it were, there is no evidence that it was shipped straight to India, or, again, that it was thence immediately rushed overland to Tibet. Laufer himself fully realized that (*Ibid.*, p. 224): "In the sixteenth century, when maize was introduced into this region, travelling and transportation facilities there were not easier than in earliest historic and prehistoric ages ..."

There would seem to be just no time left to allow a post-Columbian introduction of American maize in Tibet and China.[1]

The most recent contribution to the discussion has come from Hatt (1951), who brings agricultural folklore into the picture. He shows the probability of a prehistoric diffusion of the plant into Indonesia, basing his arguments essentially on a study of the aboriginal myths and beliefs associated with the plant, while he also stresses (*Ibid.*, p. 903) the shortcomings of Laufer's theory on the overland post-Columbian diffusion of maize to Tibet and China.

Let us finally cite Mayers (1867, p. 90) to the effect that according to Chinese traditions prevalent in Kweichow Province, near the western hill-country, maize was introduced there by General Ma Yüan, who lived from 14 B.C. to 49 A.D.

All told, it would seem that present botanical evidence favours an American origin of maize and its nearest (but not very close) relatives, yet historical evidence argues rather strongly a pre-Columbian cultivation of the same plant in southeast Asia. This would seem to justify Stonor and Anderson's opinion that maize was a pre-Columbian crop plant in Asia; the more so since they expressly admit that the *direction* in which the plant had travelled was still uncertain. They wrote (1947, p. 395): "This new evidence, in other words, tells us little or nothing about the origin of maize."

Carter (1946, p. 19) once said: "The combined efforts of geography, botany, and anthropology applied to the study of American agricultural origins offer a most fruitful field for research productive of new insights for all. ... Neither the anthropologist nor the botanist nor the geographer can alone wrest the fullest knowledge from the domestic plants of America. But by working together, the riddles of the origins of American agriculture can be readily solved to the great profit of all."

With regards to maize, botany indicates a New World origin of the plant. Anthropology shows that primitive maize was suddenly introduced into coastal Peru about 700 B. C., whereas it was known north of Mexico as early as about 2000 B. C.[2] No archæological dating from the Old World is available, but history argues a pre-Columbian introduction, while the early geographical distribution in continental Asia is enormous, and comprises widely separated and mutually isolated spots from Persia to Tibet.[1]

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[1] Mangelsdorf and Oliver subscribed to the phantastic theory of this hurried trans-continental diffusion because, as they say (1951, p. 276), this route, "being more largely a land route, does not demand the fabulous feats of navigation on the part of pre-Columbian people..."

[2] The results of Carbon-14 testings applied to archæological stratification of maize in Huaca Prieta (Peru) and Bat Cave (New Mexico).

The practical routes to and from America in aboriginal times are few and may readily be sorted out. The most conspicuous passage is the narrow geographic leap across the Behring Strait and Aleutian Islands in the extreme North Pacific. Merrill (1936, p. 6) says: "If man reached America over a northern route, as he unquestionably did, he came as a primitive nomad dependent on hunting and fishing. Even if he had any knowledge of agriculture in Asia he would have entirely lost that knowledge in the many generations involved in his occupancy of the New World. He brought no crop plants with him from Asia because the climatic conditions in the northern part of his route of migration are inimical to agriculture."

These are important observations, only to a minor extent modified by points brought up by Linton (1949, p. 174): "It is becoming increasingly clear that there have been considerable fluctuations of climate in the Behring Strait region during and since the Pleistocene. Not only did a number of Asiatic temperate climate forms, such as the bison, enter America from Asia during the Pleistocene, but, in quite recent times, prairies seem to have extended right up to the Strait on the American side. The not infrequent changes in sea level which took place during the Pleistocene must also be reckoned with, since the closing of the Strait must have meant a much warmer climate to the south of it than we have at present."

How much these climatic changes may have affected man on his northern spread into the Americas may be difficult to visualize, but only if at a future date botany or archæology should find evidence of a primary centre of maize cultivation in coastal East Asia do we have to consider whether or not this crop plant might have spread with man in drifting craft to the vicinity of the present Oregon or California by a southern branch of the Kuroshivo or North Pacific Current. In such an eventuality, the introduction of maize must have been on the coast to the south of the present Northwest Indian territory, or else have passed that area before the historically known Northwest Coast tribes arrived, since these were as ignorant of maize and other cereal cultivation as the Polynesians, although maize in historic time has been successfully introduced into the heart of the Northwest Indian territory (Bella Coola).

If, on the other hand, future discoveries should confirm that maize is an aboriginal *American* plant, *exported* to Asia in late prehistoric time, then we cannot look to the Kuroshivo Current or the northern route for its departure. The admitted absence of the plant from all the islands of Polynesia, Melanesia proper, and Micronesia, would then imply that it had spread in prehistoric time, *as other plants did immediately upon the arrival of the Spaniards*, down with the wind from Mexico to Southeast Asia in the latitudes between Hawaii and the equator.

It is not impossible that early Peruvians tried to sow maize in Polynesia, and that seeds were carried along together with the sweet-potato, gourd, cotton, etc., by the planters from early Peru who, to judge from the Polynesian plant domestication, landed successfully on the islands. The voyagers would not necessarily have been able to safeguard all their food crop during the final landing through Polynesian reefs and surf. The most exposed vegetable supply on the Kon-Tiki raft was lost in these last yards of the voyage. Again, maize might also have seen successfully sown, but failed to result in a successful crop. The Mendaña expedition explicitly recorded (Quiros 1609 b, p. 23) that the crew "sowed maize in presence of the natives" on Tahuata Island in the Marquesas, but for one reason or another this afterwards had no noticeable result on the local island agriculture. Maize may therefore apparently disappear at an introductary period before it can become successfully established. On the other hand, it cannot have spread *from* Asia *to* America against the wind, across the broadest span of the Pacific, unless it was firmly established in the island agriculture on all the necessary stepping-stones en route.

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[1] Stonor and Anderson (1949, p. 387) say: "Under Vavilov the Russians made a comprehensive survey of Oriental maize which was reported upon by Kuleshov in 1928. ... It demonstrates that varieties similiar to those described from the Naga country are widespread in central Asia from Persia and Turkestan to Tibet and Siberia." Also (p. 393): "Kuleshov describes and illustrates dwarf, drought-resistant types from Persia."

Thus, if the Pacific Ocean represents the geographical area which enabled early man to carry primitive *Zea mays* between the two hemispheres, then the only two feasible sailing routes will be: either *to* America in the open ocean area *north* of Hawaii, or *from* America in the open ocean area *south* of that island group. At any rate, the fact that Mangelsdorf (1949), in H. W. Dick's excavation of Bat Cave in New Mexico, found the most primitive (and *Sorghum*-like) maize which is known in the New World, and which antedates the earliest introduction of maize in the Chimu area of North Peru by 1000—1500 years, shows that maize cannot have entered America on the coast of Peru, since it occurred at a very much earlier date among agriculturists to the north of the Panama Isthmus.[1]

Due to the unfavourable conditions for archæological preservation in the damp jungle areas of the Isthmus and in Eastern South America, we do not know the absolute antiquity of maize in these parts, but we do know that the ancient type of race A still survives as an element in the highly heterozygous maize of the eastern Brazilian river basins. (Stoner and Anderson 1949, p. 390; with Cutler 1946.) As far as the voyaging feasibility is concerned, we must therefore not overlook the fact that an early introduction across the Atlantic north or south of Africa offers a third possibility to be considered parallel with the possibility of local American origin, or introduction across the Pacific north of Hawaii. Persia and South America, as previously stressed, are on the same half of the earth, whereas the Pacific coast of Indo-China and the Pacific coast of Peru are separated by 180 degrees. Without suggesting a *prehistoric* local spread, even Mangelsdorf and Oliver (1951, p. 276) emphasize that: "Colombia, for example, where living counterparts of the Assamese maize are known to occur, is actually appreciably nearer to Assam via the Caribbean Sea, the

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[1] Mangelsdorf (1949, p. 243) says: "The remains are conservatively estimated to represent a span of approximately 3000 years, beginning not later than 2500 B. C. They may actually have begun much earlier." See also Carter (1950, p. 175). Stonor and Anderson (1949, p. 393) say: "For maize itself, two facts suggest how complicated a story may be involved: (1) The relationship of *Sorghum*, Assamese maize, and prehistoric North American maize. Whatever the explanation, it is clear that the maize of Assam is more like *Sorghum* in a number of different ways than is any other modern maize as yet examined in detail. Whatever the explanation, it is also clear that the earliest prehistoric maize cob described from Bat Cave, New Mexico, by Mangelsdorf and Smith (1949) is even more *Sorghum*-like in the details of its inflorescence, while cobs from the upper layers of the same cave are as radically un-*Sorghum*-like as it is possible for maize inflorescences to be." See also H. W. Dick as cited by Jakeman (1950, p. 33); and Mangelsdorf and Oliver (1951, p. 278).

Atlantic Ocean and Africa than via the Pacific." On the other hand we can not ignore the archæological evidence which shows that the people of the north Peruvian coast grew gourds and cotton many centuries before they had maize. Carter (1950, p. 176) tentatively pointed out that this may suggest that maize did *not* accompany gourd and cotton in its introduction among the respective American aboriginals, but that it might have entered America at a later date and perhaps along quite a different route. He (*Ibid.*, p. 177) writes: "Distances across the Atlantic are almost half those of the Pacific and the winds and currents are from Africa to America. At the present moment, however, we can conclude nothing as to the home of maize except that an Asiatic or African home of a prototype cannot be dismissed."

Whatever the future may hold in store as to the occurence of maize in pre-Columbian Asia, it will have no bearing on Polynesian anthropology, and cannot serve as a positive argument against an American origin of the Polynesian tribes. The most feasible working hypothesis at present seems to be that maize as a crop plant originated in America, where it was known north of Mexico earlier than on the coast of North Peru. From Pacific Mexico it *might* have spread directly down-wind and down-stream to the neighbourhood of the Philippines, before the time of Columbus.

The effect on Polynesia of the absence of rice in Melanesia

It is noteworthy that those who have considered the absence of maize in Polynesia to be a valid argument against intrusion from America generally abstain from applying the same argument to the typical Asiatic rice. Fornander (1878) is in this respect an exception. He admits that the complete absence of rice from Polynesia does not agree with known facts about "the Malays or Javanese, who, when they arrived from India, brought with them their rice-eating proclivities, and spread the use of the article as well as the name, throughout the Archipelago."

J. M. Brown also (1927, Vol. II, p. 146) says: "If the Polynesians set out on their long voyages into the Pacific furnished with the suckers or tubers of these cultivated plants, it is difficult to understand why they left behind rice, the staple food of the south-east of Asia for thousands of years; it is now cultivated with success in most of the Polynesian groups; and if they started from a rice-eating region, the seed would have been certain to accompany them."[1]

Certainly, the absence of rice in Polynesia is no proof against a Malay intrusion into Polynesia, since the Micronesian atolls would prove an impassable barrier to rice just as to breadfruit or banana. However, the absence of rice goes to illustrate the point previously emphasized, that the Polynesian navigators did not take their Old World crops from Indonesia, but from adjoining Melanesia. And in Melanesia rice was *not* a locally available food plant. Such Indonesian food staples as had not been diffused into Melanesia through Melanesian barter and migrations, were not conveyed by them to the eastern margin of their enormous semicontinental buffer-state, and were therefore not accessible to the islanders of Polynesia. There is, accordingly, no evidence that other Old World people than the Melanesians have contributed crop plants to the island world of Polynesia. What Melanesia did not yield to Polynesian plant domestication was carried out to the islands from aboriginal America.

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[1] Merrill (1950, p. 8) points out that the Polynesians had no Old or New World cereals, "not even rice, that standard staff of life of the warmer parts of the Old World."

As far as America itself is concerned, no recognizable crop plant in the local agriculture can apparently be recognized as introduced by Polynesian visitors, because either archæology or plant genetics, or both combined, generally show that the plant occurred on the American side in prehistoric periods much earlier than the settlement of man on the East Pacific islands. There are important ethno-botanical problems waiting for a solution, but the greatest of these are concerned with the coming and going of crop plants in the New World before Columbus, and by routes which will not affect the anthropology of Polynesia.

Diffusion must be limited but cannot be excluded

Irrespective of the arguments for and against complete trans-Pacific or trans-Atlantic crossings by crop plants in pre-Columbian times, one fact is accepted by the most conservative anti-diffusionists; namely, that some plants were carried between South America and the nearest islands in the adjoining section of the East Pacific, i. e. Polynesia, before the coming of Mendaña and other Europeans.

The last general attempt to stop any unreasonable overstatement, not to say a diffusionist landslide, as result of the recent revolutionary discoveries in plant genetics and plant archæology, has come, as already stated, from Merrill (1950). As before, Merrill strongly opposes any idea of the occupation or crossing of the Pacific before the arrival of the Polynesians "within the past 1 500 years." (*Ibid.*, p. 10.) Allowing for this very reasonable reservation, he seems to modify his former extreme attitude concerning America's isolation, by saying: "We may admit that there may have been early accidental contacts across one or both oceans, but generally speaking there is no reason to surmise that the pre-Columbian civilizations in America were derived from those of the Old World."

This seems to me to be quite a fair concession—in fact all that was needed from a botanical point of view to allow seeds of gourd, cotton, and a few other culture plants to spread safely from one hemisphere to the other. We all know that organized and broad-scale transfer of culture was not carried out until Spanish colonization began in the late 15th and early 16th centuries. What we are suspicious of as regards *America* is only whether or not "accidental contacts" can have occurred in prehistoric time, thus giving us a natural answer to certain botanical and associated ethnological problems connected with that period.

As a counter-offensive to Stonor and Anderson's evidence from maize, and Hutchinson, Silow and Stephens' evidence from cotton, Merrill (*Ibid.*, p. 21) musters a list of nearly forty American culture plants which he stresses were *not* known in the Old World, and more than twice as many European and Asiatic culture plants which were *not* known in early America. Everything is included, from artichokes and rhubarb to Brussels sprouts and cabbage. We do not believe that Merrill, with these two lists, intends to demonstrate the absence of evidence for contact with early America across the sea, since elsewhere in the same paper he holds that definitely the sweet-potato, and perhaps also the domesticated gourd and coconut, were transferred by man across the water between America and Polynesia before Columbus. What Merrill probably intends to do, and what he certainly succeeds in doing, is to demonstrate that possible voyages between the continental Old and New World before Columbus must at any rate have been rare, and of an exceedingly limited nature as compared to those of the first decades of Spanish colonization.[1]

Simultaneously with Merrill's entirely defensive paper (1950) came Sauer's contribution (1950), presenting new and striking evidence on the various domesticated plants shared by America and the outside world, principally Polynesia, before Columbus. Carter also (1950), concurred with his contribution on "Plant Evidence for Early Contacts With America". Speaking for the growing trend in modern ethnobotany, he says (*Ibid.*, p. 182): "The cumulative effect of the [botanical] evidence in combination with the other lines of evidence indicate that the parallel origin of civilization in the Old World and the New must be seriously questioned. Surely our picture of the origin and growth of the Middle American high cultures can no longer rest on the easy assumption of absence of extensive and ancient Old World contacts."

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[1] Since Merrill (*Ibid.*, pp. 34, 36) entertains his readers by battering the Ekholm exhibit and Anderson *et al.* and Hutchinson *et al.* with quotations from Jeremiah (XIII.23) and Shakespeare (Hamlet), we may also allow ourselves a digression into allegory, and say: If a burglar breaks into a house and leaves his finger-printed glove behind, his solicitor cannot free him by saying: "Well, the glove is his allright, but he cannot have been there because he did not leave his coat, hat and shoes behind."

PART VII: APPENDIX

SOME ETHNOLOGICAL NOTES ON THE FAUNA

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The case of the Pacific culture plants is to some extent paralleled by the local distribution of domesticated animals. We have already seen that on a number of Polynesian islands the natives had in aboriginal time domesticated three animals, the dog, pig, and fowl. The two latter were introduced from Melanesia, and, since both were unknown to the Maori, they were probably introduced after the Maori had become well established in New Zealand and severed contact with the remainder of the Polynesian islands. The dog, however, seems to stand in a separate class. It was known all over aboriginal New Zealand, and the Maoris mention it in connection with Maui and the other earliest god-men who "fished" the unknown islands out of the virgin Pacific waste. (Colenso 1877, p. 154.) We hear of it in more concrete terms in the following statement rendered by Best (1925 a, p. 291) from a Maori historical tradition concerning the settling of early New Zealand: "The vessel known as 'Horouta' came to New Zealand from Tawhiti at the same time that those named 'Arawa,' 'Tainui,' 'Matatua,' 'Takitumu,' and 'Aotea' came. . . . This vessel came to land at Ahuahu, and then coasted down to Ohiwa. These immigrants are said to have introduced the *kuri*, or native dog, as also the *kumara*, or sweet potato."

Henry (1928, p. 380) recorded from Tahiti a myth of the "Birth of the Turtle, Fowl, and Pig" (not the dog) which clearly infers that there was a period when the early Tahitian ancestors did not know these animals. The turtle was 'born' in the Tuamotus to the far east, and thence spread to all the islands, but the fowl and the pig were born to the west of Tahiti (in Raiatea) and spread eastwards from there. Indeed, if the Tahitian ancestors came from the east they would have found the first turtles in the eastern part of the ocean, and taken the pig and the fowl from the other side. The silence here on the sudden 'birth' of the dog in the islands is noteworthy, combined with the fact that it is held by the Maori as having always been with men, and having thus arrived with their ancestors together with the sweet-potato.

The dog as a domesticated animal was widespread at an early date among aboriginal peoples on both sides of the Pacific, possibly even in Melanesia. But if the Maori got the dog from Melanesia one would wonder why at the same time they did not get the highly valued Melanesian pig and fowl as well. What is more, as opposed to the Polynesian pig and fowl, which are clearly at home in Melanesia, we do not know whether the Melanesians actually had a dog related to the Maori species, *Canis Maori*. This breed, which has long since become extinct, is neither identifiable with the wild Australian *dingo* nor with the pariadog of southeast Asia. Reischek (1924), who in the last century brought back to the Vienna collection a skin of this now extinct Maori dog, describes the species as somewhat similar to the wild yellowish dingo, with a nice soft fur, a golden or yellowish red colour, a very shaggy tail, and erect, pointed ears. The Maori chiefs used the dog's fur as ornamental clothing. Dog's fur had a similar use among the Northwest Coast Indians, who possessed a prehistoric type of dog that deserves comparison with Reischek's description of *Canis Maori.* The piece of dog-hair blanket brought by Hill-Tout from an ancient mound at Hatzic, British Columbia, has the same golden, reddish-brown colour. A somewhat collie-like dog of similar description seems to have had a wide distribution in prehistoric America, and it is not unlikely that it has followed early man from northeast Asia, representing a variety of the smaller pariadog to the south. In the northern sections of America, as well as on the Northwest Coast, the colour of the dog was very frequently white. Cook (1784, Vol. II, p. 236) speaks of Hawaiian dogs with long white hair, and an aboriginal breed with long white hair was also found in the Tuamotus.

A spread of the North American dog to Hawaii and the other East Pacific islands with Northwest Indian craft would still not explain the involved problem of the domesticated dog in Polynesia. Duff (1950 b, p. 12) shows the dog was present in New Zealand in the earliest period of habitation, before the arrival of the Maori fleet from Hawaiki, as he writes of the early 'Moahunters': "...of domesticated animals they possessed only the dog whose bones are plentiful in the middens." Thomson (1922) in his thorough-going monograph on *The Naturalization of Animals and Plants in New Zealand*, shows that the Maori claim to have had two distinct breeds of dogs, the one with long fur was said to have come from Raiatea. If we, like Colenso (1877), search the accounts of the aboriginal Maori-Polynesian dogs, as sparingly presented us by the early European voyagers, we get the definite impression that no homogeneous breed, but probably a peculiar variety of mongrels, was at least the dominant type found by them in the possession of the aboriginal Polynesians. Thus G. Forster (1777) describes the Tahitian dog by saying: "...they were of a rough long-haired sort with pricked ears, and much resembled the common shepherd's cur or Count Buffon's *chien de berger.* They were of different colours—some spotted, some quite black, and others perfectly white." Otherwise he says: "The dogs of all these islands were short, and their sizes vary from that of a lap-dog to the largest spaniel. Their head is broad, the snout pointed, the eyes very small, the ears upright, and their hair rather long, lank, hard, and of different colours, but most commonly white and brown." The elder Forster (1778) also writes: "The dogs of the South Sea isles are of a singular race; they mostly resemble the common cur, but have a prodigious large head, remarkably little eyes, prick-ears, long hair, and a short bushy tail. They are chiefly fed with fruit at the Society Isles; but in the low isles and New Zealand, where they are the only domestic animals, they live upon fish. They are exceedingly stupid, and seldom or never bark, only howl now and then; have the sense of smelling in a very low degree, and are lazy beyond measure; they are kept by the natives chiefly for the sake of their flesh, of which they are very fond, preferring it to pork."

The first dogs Cook and his companions saw at Tolago Bay, New Zealand, brought the following comment: "No tame animals were seen among the natives except dogs, which were very small and ugly."[1] Cook was served with Polynesian dog during his first voyage, and entered in his journal: "...and few were there of us but what allow'd that a South Sea dog was next to an English Lamb."

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[1] See also White (1891; 1894); Dixon (1789, p. 266); Polack (1838, Vol II, p. 269).

The food value of the Polynesian dog has to many recalled the custom of eating dogs in early China. However, dogs were also eaten in Mexico and other parts of early America. Andagoya (1541–46, p. 33), for instance, mentions that the aborigines of Central America possessed "certain small dogs which they also eat". The fact that the dogs were edible, and, as in the Tuamotus, could live entirely on fish, is enough to show that these animals could be carried across great stretches of water and even be usefully present on board in case food ran short.

The great variety, both in size and colour, and obviously in breed, among the dogs possessed by the aboriginal Polynesians points to America rather than to Indonesia and Melanesia as a source of their introduction. At the Peabody Museum of Harvard University are two mummified aboriginal dogs left by the early basket-makers in the so-called "White Dog Cave", which are thus described[1]: "The larger resembles a small collie, having long hair, erect ears, and a long bushy tail. Its colour now is a light golden hue with spots of dark brown, but the discoverers record that when found the animal was nearly white, and this circumstance gave the cave its name. A dog of similar breed was found in Inca remains at Ancon, Peru, many years ago. The smaller animal is more like a terrier: black and white, with short shaggy hair, erect ears, long hairy tail, and a stubby muzzle. It too bears a close resemblance to Inca dogs, and its skeletal structure corresponds closely with dog bones found in a cave in Virginia. Thus we have evidence that two very different breeds were widespread in America many centuries ago. The larger of the two was buried with a man, the smaller with a woman."

The excavations at the necropolis of Ancon (near Callao in Peru) were carried out by Reiss and Stübel (1880–87, Pl. 107). They found not only two but three distinct breeds of ancient Peruvian dogs, and one may well assume that intercrossings again existed between all three. The first, *Canis Ingae pecuarius* (Nehring) was the most common local breed, and in the opinion of the above authors represents the actual type from which both the other breeds might have derived as varieties. This first breed was simply described as resembling a shepherd-dog (*eine Schäferhund-ähnliche Rasse*), and: "The general colour may be described as uniformly reddish-yellow or ochre-yellow. However, on some specimens there are also brown and blackish-brown spots and designs of regular shapes on the yellow-coloured ground of the fur." This largest variety was an animal of medium size with good fur and rather slender head and legs. (See also Joyce 1912, p. 125.) The second breed, *Canis Ingae vertagus*, was a short-legged dog, somewhat resembling a dachshund, and the third, *Canis Ingae molossoides*, was a more pug-like or bulldog-like breed. With dog-breeding thus far advanced in aboriginal Peru, and with added evidence of dog varieties both in early Peruvian and Mexican descriptive art, there is an apparent possibility that this domestic animal had spread into Polynesia from the home of the sweet-potato.

The Polynesians held their dog, the *kuri* (literally "golden") in high regard, and the same must have been the case with the early Peruvians. Some of the Ancon dog mummies were carefully wrapped in cloth, and Eaton (1925, p. 64) records from Machu Pichu the

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[1] Southwest Museum Leaflets, No. 11, 1939. See also Sayles (1936, plate 31) for dried remains of aboriginal dog from cliff dwelling.

"skeleton of a fairly large sized dog in the undisturbed grave of a person of high degree". In New Zealand also White (1891, p. 544) speaks of the discovery of "the skeleton of a Maori dog which had evidently been buried with some show of respect. The bones were found in a small cave, and the remains of a mat—a few fragments only—in which the dog had evidently been wrapped, were lying around."

We have stated earlier that a few of the Polynesian islands had no dogs when first visited by Europeans, yet they had preserved its memory well. That the dog was as firmly established among the early Maori-Polynesians as the pig was among their neighbours in Melanesia was amusingly illustrated by Cook's early companion, G. Forster. During a visit to Tongatabu, which was one of the few places in Polynesia where no dogs were found by the Europeans, Forster (1777) speaks of a visit on board the ship by the local chief Ataka: "...just as he was going out of the cabin he happened to see a Tahitian dog running about the deck; at this sight he could not conceal his joy, but clapped his hands on his breast, and turning to the captain, repeated the word *kuri* near twenty times. We were much surprised to hear that he knew the name of an animal which did not exist in his country, and made him a present of one of each sex, with which he went on shore in an ecstasy of joy. That the name of dogs should be familiar with a people who are not possessed of them seems to prove either that this knowledge has been propagated by tradition from their ancestors, who migrated hither from other islands and the continent, or that they have had dogs upon their island of which the race, by some accident, is become extinct; or, lastly, that they still have an intercourse with other islands where these animals exist."

Both Forster the Elder and the Younger specifically mention that the dog was absent from nuclear parts of Melanesia, such as New Caledonia and the New Hebrides, and we learn from the latter group (G. Forster 1777): "Hogs and common poultry are their domestic animals, to which we have added dogs by selling them a pair of puppies brought from the Society Islands. They received them with strong signs of extreme satisfaction; but as they called them hogs (puaha), we were convinced that they were entirely new to them."

There is nothing in the zoology of the Polynesian islands that argues against man having arrived in these islands from the east. Apart from their varieties of dogs, the early Peruvians had truly domesticated the llama (*Lama glama*), the alpaca (*Lama pacos*), the guinea pig (*Cavia porcellus*), the Muscovy duck (*Cairina moschata*), the turkey (*Meleagris gallopavo*), and to some extent the parrot (*Amazonia sp.*), but few of these would be very likely to accompany early man on a long oversea voyage to Polynesia in primitive craft. The wild bush-rat or fruit-rat of aboriginal Polynesia, *Mus exulans*, the only local terrestrian mammal apart from the domestic dogs and pigs, was probably deliberately imported from Melanesia, where these rodents are common. It was also hunted on some islands with a miniature bow and arrow, otherwise a non-Polynesian but typical Melanesian weapon. Its meat was considered a delicacy among the natives. (See Rutland 1890; White 1895; Stone 1917; Stead 1936; etc.)[1]

As stated, there are no reproductions of animals in Polynesian-Micronesian art, nor

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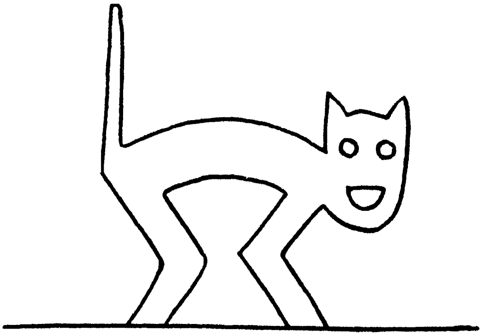
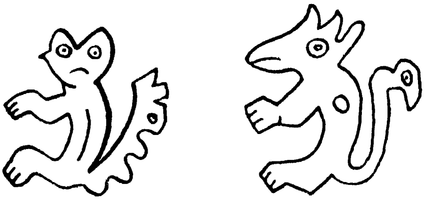
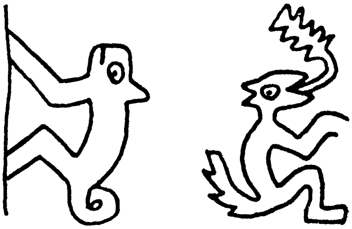
[1] In 1932 *C. Nicolle* advanced the theory that the typhus of the rat had been brought to America with the craft of early Pacific migrants.



THE PUMA OF PERU
Carved on ornamental paddle



ANCON



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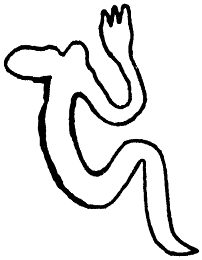

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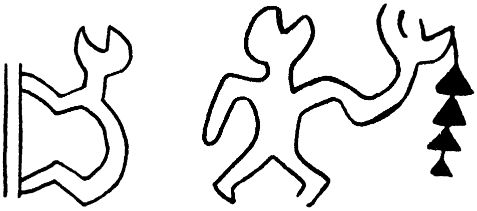

EASTER ISLAND SCRIPT

any of the historical memories from the fatherland, reminiscent of the elephant, the sacred buffalo, or such other large and characteristic animals which have played a principal role in the art and religion of the peoples of Indonesia from the dawn of time. The little in the way of animal reproductions and animal memories that is to be found in Polynesia seems to refer in a striking degree to those animals which have widely occupied the aboriginal mind specifically on the American side of the Pacific.

We have mentioned the Maori recollection of the marine but tusked *maraki-hau* of their ancestral coasts, identifiable with the walrus which abounds in the northern section of the Northwest Coast Archipelago. If we turn to Easter Island, we find another strange creature repeatedly occurring as an important ideogram in the local script. (See figure above.) It has been suggested that this peculiar mammal, so important to the early Easter Islander's mind, may be a representation of the local native "rat". (Bishop Janssen, quoted by Moeller 1937, p. 19.) But certainly no artist, however primitive, would reproduce a rat raised up on such remarkably long legs, with an arched back and withdrawn abdomen, and with a slim neck connecting the body to a circular head that has ferocious open jaws. Indeed, this can be nothing but the simplified reproduction of a feline animal. The reason why this has not immediately suggested itself to observers is that neither the cat, nor any other feline species, can ever have been observed by the aboriginal Easter Islanders on any of the neighbouring islands in the Pacific; they were unknown even in Melanesia, Australia and New Guinea. But to the east, on the nearest coast, the feline form was one of the largest and most conspicuous elements in the former mammalian fauna. Since early centuries B. C. (Bennett and Bird 1949, p. 124) until Inca times, the puma, at least as a symbol, has been the object of reverence among the high-cultures throughout Peru and depicted as stylized designs and ideograms in paintings and reliefs.

Several observers have not omitted noticing the feline characteristics of this frequently returning motif in the Easter Island script, and Moeller (1937, p. 14), referring to it as a "cross between man and puma", quotes Thompson from the same island: "The most common figure is a mythical animal, half human in form, with bowed back and long claw-like legs and arms. According to the natives, this symbol was intended to represent the god 'Meke-Meke', the great spirit of the sea. The general outline of this figure rudely carved upon the rocks, bore a striking resemblance to the decoration in a piece of pottery which I once dug up in Peru, while making excavations among the graves of the Incas." Stokes (1907, p. 32) first published the arch-backed figure appearing in stone relief from early Hawaii, which has caused comment because of its resemblance to the Easter Island figure. It is reproduced on page 505 together with the Easter Island ideogram and some of the most common symbols from the north and central coast of Peru.[1]

We have seen by way of analogy, that the two mammals carved in relief at the base of the San Augustín-like monolith in the Marquesas may well represent the same two feline animals that are carved in the same fashion on the base of the bearded Tiahuanaco monolith. Their slim and erect tail, trunk-like body, and rounded ears can hardly depict the *Canis Maori*, and certainly not the Marquesan pig.

Percy Smith (1910 a, p. 137) also made the following interesting observation regarding a strange ancestral beast recollected from the early Polynesian Fatherland: "In the story of the snaring and killing of Matuku, a man-destroying monster, it is stated that the urine of the animal is very hurtful. This is characteristic of feline animals, but applies to none that the Polynesians could have met in the Pacific."

Apart from the arch-backed mammal, the only animals depicted in the Easter Island script and ornamental art are the fish and, above all, a frequently hook-beaked bird which is even more important than the feline design. When we note that there are no corresponding hook-beaked birds in that part of the ocean where the Easter Islanders live, even this seemingly insignificant detail may assume some importance. Balfour (1917) saw the frequently recurring hooked form of the beak on the Easter Island birds and symbolic birdmen, and suggested a connection with the hook-beaked frigate birds of the remote Solomon Islands. He demonstrated the existence of a similar bird-motif among the Melanesian Solomon Islanders, and for years this analogy was accepted as a welcome

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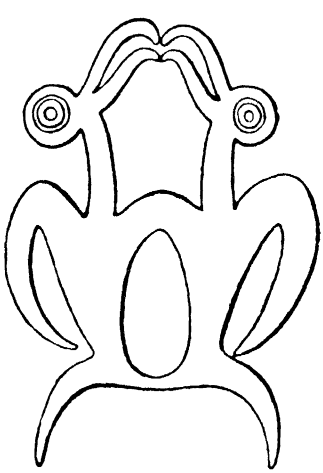
[1] From Schmidt (1929, p. 419); Reiss and Uhle (1880—87, Pl. 103); and Ross (1940).



Design carved on head of Easter Island wooden image. (From Routledge 1919.)

argument in favour of eastward migration, until Métraux (1940) and Shapiro (1940 b) launched a vigorous attack against all claims that there have been Melanesian elements in Easter Island. But St. Johnston's argument of 1921 (pp. 103, 109), has apparently passed unnoticed: agreeing in principle with Balfour's theory that eastward travelling Melanesians had introduced the hook-beaked frigate birds of the Solomon Islands into the Easter Island art, he says: "—but what one would like to know is: Did they themselves arrive upon an empty land, or was there a previous people, possibly from America, already there?"

His own answer was: "The confining of a people upon a small island has, I am convinced, a degenerating effect, and it seems hardly credible that this wave of Melanesians from the Solomon Islands, strong and fierce though they might be in war, and skilful at carving though they might be in peace, could have evolved for themselves the grand ideas of the great sloping stone platforms, the vast stone terraces, the colossal works everywhere, so totally different from their own culture in the Solomon Islands. Were not these ideas rather brought in by a migration of people from South America?"

To keep this in concord with the usual Asiatic migration doctrine, the author hastens to suggest that the South American element need only be "a backwash of the earliest Polynesians—, but advanced in culture and technique by a residence of possibly some centuries in the more helpful environment of a continent." A footnote adds: "Since writing the above a thought has occurred to me. Can it be that the hook-beaked birds were not Western Pacific frigate-birds at all, but South American vultures, or even eagles, the Sun-birds? This will completely upset the Melanesian theory, but strengthen the American theory."

We may add that in South America the hook-beaked 'Sun-bird', actually the condor, is very often reproduced in symbolic art in a rather remarkable way, having a condor's head and wings, but the lower body of a man. This is exactly how the same creature is depicted in the Easter Island script, and in local reliefs, petroglyphs, and murals. It is, to say the least, highly remarkable that lonely Easter Island should select as its animal reproductions an arch-backed mammal and a hook-beaked bird-man, the very two specific and characteristic symbols of early Peruvian art, from the range of the Andes and down to the whole pre-Inca Pacific coast. Moeller (1937, p. 10) even pointed to some of the specific bird-man ideograms in the Easter Island script, where the figure carries a staff in one or in both hands, and said that on a certain vase from Peru (Truxillo) "is a mythical bird represented between two staffs, looking as if it were taken out of the Easter Island script." She carried the comparison further, and pointed to the carvings on the Gateway of the Sun at Tiahuanaco, where the Sun-god (Tici) holds a ceremonial staff in each hand, surrounded by hook-beaked bird-men also carrying staffs, and ornamented all over with hook-beaked bird heads and puma heads. See also Plates LXXXI **2**, LXXXII **1-6**.

Preuss (1928) has again shown how the sun-god with a staff in each hand can be traced in the art of the megalithic centres of Tiahuanaco, Chavín and San Augustín.[1]

Métraux (1940, p. 64) speaks of another animal memorized in Easter Island tradition and referred to as *kekepu*, "a rather strange beast which was very like a 'pig or a cow' ". What the *kekepu* is, nobody will probably ever know; it might just as easily be a reference to a llama as to any of the rare hoofed animals of New Guinea.[2]

We have seen that there is an increasing interest in a coordinated study of ethnology and botany in regard to the Old and New World culture plants. Very little has so far been done to encourage a similar coordinated study between ethnology and zoology, with the emphasis on parasites. Darling (1920, p. 233) pointed out the importance of a further study of hookworms among American Indian tribes. He showed that either *Necator americanus* or *Ancylostoma duodenale*, or both, must have been introduced into the American continent "by voyagers or storm-tossed fishermen" from Asia, Indonesia, or Polynesia, and he specifies the following routes and possibilities:

1. The immigrants came to America by way of the Behring Straits. In that case the temperature must have been warmer in that area to permit hookworm infection to persist.
2. The immigrants came along temperate latitudes from Asia or Indonesia. In that case either or both *Ancylostoma duodenale* and *Necator americanus* might persist.
3. The immigrants came from Polynesia. In that case only *Necator americanus* would be found.

He writes: "If certain tribes in America are found to be infected with *Ancylostoma duodenale* as well as *Necator* this will suggest their having come to this continent via the sea from those countries in Asia where *A. duodenale* and *N. americanus* are found to be infecting the natives, i.e., Japan and China... A careful hookworm survey of existing Indian tribes may disclose the presence of more than one primitive stock..."

Since Darling made this suggestion, *Ancylostoma duodenale* has been reported from aboriginal American tribes by several parasitologists. Thus Soper (1927), in his study of hookworm distribution among Paraguayan Chaco Indians, found an almost pure manifestation of *Ancylostoma duodenale*, with an Ancylostoma:Necator ratio of 13 to 1. The author stresses the great significance of the hookworm study to ethnology, and says (*Ibid.*,

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[1] The staff as ceremonial badge symbolized high rank in Polynesia. At the time of Roggeween's discovery of Easter Island, Behrens (1737, p. 137) wrote: "It was not possible to determine whether these people have a king, as there are no great distinctions between them; save that the eldest among them wore white feathers on their heads, like ostrich feathers in appearance, and carried a staff in their hands." Later Geiseler (1883, p. 48) wrote from the same island that the chief carried a very long ceremonial staff on special occasions, ornamented with a double head at the upper end. Buck (1930, p. 631) wrote from Samoa on the opposite side of Polynesia: "Both high chiefs and talking chiefs used wooden staffs (*to'oto'o*) as walking sticks on ordinary occasions, and as a symbol of rank during ceremonial conducted in the open air." Beautifully carved ceremonial staffs were also made in the Marquesas group, and copies of early specimens are still carved today on Fatuhiva Island. Ceremonial staffs, elaborately carved in a pattern very reminiscent of woodcarvings in southeastern Polynesia, are well known from pre-Inca desert graves on the coast of Peru. (Schmidt 1929, p. 419; etc.)

[2] There are also traces in Polynesia of a former serpent-worship (Fornander 1879, Vol. I, pp. 43, 77), which in the Marquesas, in the absence of snakes, is associated with eel-myths and eel-fables. On some islands an alligator-like animal with spined back living in caves is also memorized in tradition. This may point to tropical Asia as well as to tropical America, but in the former case one may again wonder why the elephant has not equally long survived in tradition. (See Colenso 1878, p. 91; Skinner 1949, p. 358.)

p. 182): "The correlation of this finding with the species distribution of hookworms by races and geographical areas indicates that the Amerind race originated in Asia or Indonesia, north of latitude 20° N.; that migrations to America were either through the Pacific or via Behring Straits; if by the latter route special conditions (either climatic or of rapidity of migration) must have obtained at the time of migration." Concluding that the migrants cannot have left Asia south of 20° N, (*Ibid.*, p. 181), the author shows, as also suggested by Darling, that the point of departure for the Ancylostoma-infested proto-Americans must have been on the coast of China or Japan, whence they passed fairly quickly into a temperate area of the New World, north of Polynesia, but south of the Arctic. The author obviously realizes that other migrants may have followed the Arctic land-route, but he judges by the hookworms that can only have followed man:

"Had migration been limited to Behring Straits, it must have occurred when the temperature of that region was more favourable to hookworm larvae than it now is, or it must have occurred from a region which was favourable to hookworm in Asia to a favourable zone in America in less than the maximum life span of the hookworm."

A drift voyage with the North Pacific or Kuroshiwo Current, as previously suggested, from the temperate zone of East Asia to the temperate zone of Northwest America, would pass the cold northern latitude in much less than the lifetime of an *Ancylostoma*. This may be important knowledge, if at a future date other evidence should come up giving actuality to the theory that some drift voyagers were among the various East Asiatic migrants who followed the northern route into the New World. But Polynesia did not serve as a stepping-stone for this transfer, and the local *Necator americanus* might well have reached the East Pacific islands directly from America.

PART VIII

ABORIGINAL PERUVIAN NAVIGATION IN THE EAST PACIFIC

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The essential condition for a successful spread of culture plants by human agency across the sea is the presence of buoyant craft and navigation. The general disbelief in the transoceanic diffusion of crop plants in pre-Columbian times is founded entirely on a widespread scepticism as to the navigational abilities of man before Columbus' voyage in 1492. Columbus' time marks a turning-point in the world history of navigation.

This turning-point, however, concerns political or economical rather than *physical* geography. To be able to judge the feasibility of a surface drift or a surface voyage by craft in any period we have to consult physical geography alone. The ocean did not change in 1492, nor did the endurance of man and the buoyancy of his water-craft. History—and archæology—can tell us that man's courage, desires and abilities were not at an outstanding peak in the late mediæval era when Columbus gathered his crew. Nor were his caravels more seaworthy than many craft built among nations of earlier millennia. Columbus and his Spaniards changed America and affected the whole history of the world because they exploited their visits to the aborigines on the far side of the Atlantic. Leiv Eiríksson and his Norsemen visited American Indians five centuries earlier, but barely survived in history because they merely came back with a report of their discovery. A voyaging party that only went one way and never came back would not survive in history at all. Yet they might well have planted cotton and gourd that survived on the other side.

It would be rash, with our present knowledge, to attribute any specific origin to the aboriginal agriculturists who brought certain Old World crop plants to tropic America, but it would be even more so to affirm categorically that they could not have preceeded the historically recorded Spaniards and Vikings in coming from oversea.

The problem of aboriginal navigation in Peru

It is a well-known fact, as pointed out by Sayce (1933, p. 261), that "The argument for and against the independent origin of American cultures has up to the present turned largely upon the geographical position of America."

With the deeply rooted scepticism regarding the capacity of craft and seamen among European and other Old World civilizations before Columbus, it is only natural that the formerly unknown New World branches of mankind which were found and subjugated by the expeditions from mediæval Europe have been assumed to stand still lower as navigators. The early European civilizations had at least developed ships; the aboriginal Americans had only canoes, reed-boats, pontoon-floats, and open rafts.

At an early stage in his various attempts to point out the favourable position and cultural possibilities of America as a centre of diffusion into the aboriginal East Pacific, the present writer (1939 MS; 1941; 1946 MS.) found that the stumbling-block, not to say complete barrier, in the way of such proposals was the absence in early America of any type of craft counted as seaworthy by observers familiar only with the European principles of boat-construction. The most capacious ocean craft, and the only ones actually known to have gone under sail in pre-Columbian America, were employed on the Pacific coasts of the Inca Empire, and these were mere rafts, composed of an odd number of logs lashed together by ropes. In ethnology, the log-raft is generally regarded as the lowest form in the evolutionary stages of primitive boat construction. Even a dugout log is considered a step higher towards what to the European mind represents a true 'boat', namely a watertight compartment—a hull which is given buoyancy, not by its own specific gravity, but by the displacement of the water by air. Again, a *sea*-going craft, according to the same current conceptions, is evolved only when the keeled boat increases in dimensions until it outgrows the waves, resists their individual movements, and lifts the crew to a safe distance above the water. Naturally, with these accepted standards of boat construction, the balsa rafts of northwestern South America were, without further investigation, classed with the rudest marine inventions of palaeolithic man.

This apparent incongruity between the primitiveness of the Peruvians' boat construction and their high cultural standards in most other branches seemed quite disproportionate, especially as the Inca Empire had a coastline of over two thousand miles, along which lived a confederation of culture peoples comprising hundred thousands of intelligent individuals,[1] who to a great extent depended upon the ocean for their food and economy.

The Peruvians at the time of the Conquest were not unfamiliar with the principles of a hull. They had on their rivers, and even in certain harbours like Callao, the usual dugout canoes. (Lothrop 1932, p. 231.) But whenever they built a larger ocean craft in the specific shape of a true European 'boat', they built it with the bottom and sides lashed together of bundles of canes or reeds, in such a way that the water could flow in and out at will. This should give us a guide. They had wooden canoes, and were otherwise acquainted with the form of a regular boat with pointed ends and raised sides, but for coastal traffic they never combined the two ideas to construct a large craft in which the sea was prevented from washing in and out. Perhaps they considered their wash-through architecture an ingenious system suitable to their purpose; and perhaps it was. The same principle of not resisting the free movement and the passing in and out of the water was applied to their balsa-wood log-rafts, and to certain peculiar pontoon-like craft which they made by lashing inflated seal-skins together, or even quantities of air-filled calabashes in large nets.

The early Peruvians were people of no mean intelligence; this was discovered by the early Spaniards and can still be verified archæologically. Ashore, they irrigated barren desert areas and fertilized their terraced fields with guano imported from the islands; they constructed miles of good roads with pavements, aqueducts and suspension bridges; they had an organized social system, with large mobile armies and an ingenious fortification system; they were excellent architects, and great explorers and inventors; they had acquired culture plants and culture elements unknown in contemporary Europe; mastered medical trepanning; and made delicate scales that responded to weights down to 0.05 g.[1] On the coast they were even masters in ocean fishing, wood-carving, and in dubbing planks. All things considered, it would be most surprising if their marine architecture was at the stage of the most primitive barbarians. The unfamiliar reed-ships, pontoon-craft, and balsa-wood rafts of aboriginal Peru should therefore have been suspected of possessing some qualities that would explain why their owners selected them for local use instead of developing their fresh-water canoes to a larger size. Though this reasoning, I must admit, would hardly have occurred to me if I had not already been wondering by what means aboriginal Peruvians could have landed across the ocean in Polynesia.

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[1] The census for the Audiencias of Lima and Charcas in 1561 shows 1 490 317 Indians, rapidly decreasing in number to 608 894 in 1796. (Kubler 1946, p. 334.)

When I decided in 1947 to reconstruct an early South American type of balsa raft, I did it as much to demonstrate its sea-going abilities, of which I felt quite confident, as to prove that with such a craft Polynesia was within the range of aboriginal Peru.

I must admit, too, that my knowledge of balsa rafts as such was rather limited until my return from the Kon-Tiki raft expedition the same year. It was based principally on Augustin de Zárate's eyewitness account (1555) and on Friederici's excellent report on aboriginal American water-craft (1907), together with the ancient drawings of early balsa rafts in Benzoni (1572), Spilbergen (1619), and Best (1925 a), the latter redrawn by Richardson after Juan and Ulloa (1748), where I subsequently found the original after my return from the expedition. Apart from some surviving memories in coastal Ecuador and Peru I managed to get little or no information beyond the basic facts as assembled in Friederici's report. Owing to the increasing tendency towards specialization, some of the leading contemporary Americanists with other spheres of research had failed to take any notice of the balsa rafts found with the reed-boats off the pre-Spanish Andean coast; while others who had observed the many early Spanish references to these capacious balsa-rafts were firmly convinced that they would at any rate be useless for navigation at sea.

After my return from the expedition the feasibility of a balsa raft voyage from Peru to Polynesia was accepted by most observers, yet the experiment seemed only to have provoked an increased opposition from certain quarters, which maintained that the experience of the raft expedition had proved nothing. One prominent Pacific anthropologist told the daily press that the qualities of a balsa raft were of no interest in a Pacific study, since he believed that the balsa tree of which the Kon-Tiki raft was built had formerly grown only on the Atlantic side of the Andes, and since there never were any mariners in Peru.[2] An authority on Andean highland archæology wrote, also in the press, that the balsa raft was indeed a prehistoric vessel on the Pacific side of the Andes, but only in Ecuador, north of Peru. The aboriginal Peruvians, according to the same informant, had only one single type of coastal craft, namely reed-boats. He added that centre-boards, as used on the Kon-Tiki raft, were probably unknown in aboriginal America until introduced by the Spaniards.[3] A specialist in Ecuadorian anthropology realized, with the chronicler Cobo as his source, that balsa rafts were used on the aboriginal Pacific coast both of Ecuador and Peru, but he still insisted that they could never have reached Polynesia because Peruvian fishermen never went further from land than six leguas (about 24 English miles), and he held that the Indians could not eat fish, meat, and sweet-potatoes raw, which would have been necessary on a prehistoric raft without primus-stoves and matches. The same anthropologist was so convinced that a South American raft could not carry men and crop plants safely to Polynesia, that he publicly declared the Kon-Tiki expedition to be "humbug" and that the raft must have been specially constructed so it could sail with either side up, since the journey would otherwise have been "a miracle."[1] A prominent Polynesianist who had formerly stressed that Polynesia could not be reached by Peruvian rafts, declared, in spite of the qualities of the balsa raft now demonstrated, that whether or not it could drift to Polynesia was of no scientific importance, for the Peruvians could only have been fishermen, and these could not have peopled formerly uninhabited islands in the ocean; he had himself never heard of fishermen who had women aboard their craft, nor enough provisions to survive an oversea drift.[2]

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[1] See Linné (1939, p. 10).

[2] Interview with Ralph Linton in *Aftenposten*, Oslo, October 3, 1949.

[3] Rydén (1949).

Such arguments showed that not only were the qualities of balsa rafts quite wrongly judged by modern writers, but the extent of their uses in early South America was overlooked or underestimated by many contemporary observers. Nobody had ever to a full extent collected and presented such fragmentary information as was available, from the various early chroniclers and from modern archæology, on balsa rafts and navigation off the early Andean coast. It proved to be necessary, upon my return from the Kon-Tiki expedition, to demonstrate through further research not only the seagoing qualities of the Peruvian balsa raft, but also its local prehistoric existence and uses. A summary of such evidence will here be presented.

Balsa rafts met at sea as the Spanish discoverers approached the Inca Empire

We have already seen how Francisco Pizarro and his followers, in 1524 and 1526, set out on two successive expeditions southwards along the Pacific shores of Panama and Colombia, and how they were at first disappointed at finding only steep hills or dense jungle coasts with mangrove swamps and few Indians. Pizarro and his party finally came as far south as the Gallo and Gorgona islands off the south part of the coast of Colombia. Here, we learn from the various chroniclers, they had much trouble with the Indians, some of whom lived on the islands and others came out on "craft built from logs". (Pizarro 1571; etc.) Various unfortunate circumstances made Pizarro decide to remain with his soldiers in this vicinity, while he sent on his experienced pilot Bartolomeo Ruiz to explore the coast ahead. Ruiz sailed on with one caravel of about 40 tons and a few sailors,[3] and finally reached the level coastal areas of Ecuador, never before seen by the Spaniards. He also became the first European to cross the equator on the Pacific side of South America. Here he found increasing signs of culture and a better populated coast.

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[1] Karsten (1949) who launched this vigorous attack a few weeks before the film of Kon-Tiki's journey was released in his country, was later forced to modify his words and say that he recognized the expedition—but as *almost* a miracle. (*Nya Pressen*, December 9. 1949.)

[2] Interview with Peter Buck in the *Auckland Star*, Auckland N. Z. February 7, 1949.

[3] 10 Spaniards, according to Murphy (1941, p. 25).

Somewhere off the northern part of the coast of the present Ecuador, Ruiz met a peculiar vessel northbound from the Inca Empire, heavily laden with cargo from that southern country with which no European was yet acquainted. What makes this particular incident of the greatest ethnological value is that the meeting of these two vessels was also the first meeting of our own race with natives and culture elements from aboriginal Peru.

The report of this event was immediately written down by Juan de Sáamanos for King Carlos V (the Emperor Charles V) and the original manuscript was published by Navarette in Madrid in 1844. (See Sáamanos 1526.) Thus the episode was preserved in writing even before Peru itself had seen a European ship.

Sáamanos (*Ibid.*, p. 196) says that as Ruiz' party was sailing along somewhere near what is now called the Bay of St. Matthew, just to the north of the equator: "They captured a vessel which carried twenty persons onboard, of whom they threw eleven overboard. Of the others who were captured, the pilot [Bartolomeo Ruiz] retained three. He set the others ashore so that they could go away. The three who were kept as interpreters were well treated and were brought back with him. This vessel which I say he captured appeared to have a capacity of up to thirty *toneles* [36 gross tons]. The flat underbody and keel were constructed of poles as thick as posts, lashed together with ropes of what they call hennequen, which is a kind of hemp. The upper part was of more slender canes, tied together with the same lashings, and there the crew and cargo went dry while the bottom was awash. It carried masts and yards of very fine wood, and cotton sails in the same shape and manner as on our own ships.[1] It had very good rigging of the said henne-quen, which is like hemp, and some mooring stones for anchors formed like grindstones."

Following this description of the raft itself with its sail and rigging, Sáamanos goes on to describe the cargo, which was the first Inca booty to fall into the hands of the Spaniards. A great quantity of trading goods is listed and specified, from ornaments in gold and silver to jars, silver-framed stone mirrors, belts, headwear, and colourful costumes in wool and cotton, all typical treasures of the Inca period in Peru. We learn that all this cargo was being carried north for the purpose of barter among the foreign tribes. We even hear for the first time of the delicate Peruvian balance scales, some of which were carried on board the raft for the purpose of weighing gold. "All this they carried with them to barter for mussel-shells, from which they make red necklaces like coral, and also white ones, and with these the vessel was heavily laden."

This first pre-Conquest meeting between two sailing craft, manned by treasure-seeking crews respectively from aboriginal Peru and mediæval Spain, is surprisingly little known considering its direct importance for the further development of Spanish-American history, and in view of the number of writers who have referred to the episode.

Prescott (1847, Vol. II, Chap. iii) in his *History of the Conquest of Peru*, gives a most comprehensive description of the various events connected with Ruiz's voyage of discovery, basing his report on old manuscripts, including the chronicles of Juan de Sáamanos (1526) and Francisco de Xerés (1534).[2] We may quote the following excerpts from Prescott (*Ibid.*, p. 223):

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[1] The original text runs: "Traia sus manteles y antenas de muy fina madera y velas de algodon del mismo talle de manera que los nuestros navios."

[2] Xeres was from 1530 the secretary to Pizarro, who wrote his account of the early days of the conquest of Peru on the spot, by order of Pizarro. (Markham 1872, p. xi.)

"Without staying long enough on this friendly coast to undeceive the simple people, Ruiz, standing off shore, struck out into the deep sea; but he had not sailed far in that direction, when he was surprised by the sight of a vessel, seeming in the distance like a caravel of considerable size, traversed by a large sail that carried it sluggishly over the waters. The old navigator was not a little perplexed by this phenomenon, as he was confident no European bark could have been before him in these latitudes, and no Indian nation, yet discovered, not even the civilized Mexican, was acquainted with the use of sails in navigation. As he drew near, he found it was a large vessel, or rather raft, called *balsa* by the natives, consisting of a number of huge timbers of a light, porous wood, tightly lashed together, with a frail flooring of reeds raised on them by way of deck. Two masts or sturdy poles, erected in the middle of the vessel, sustained a large square-sail of cotton, while a rude kind of rudder and a moveable keel, made of plank inserted between the logs, enabled the mariner to give a direction to the floating fabric, which held on its course without the aid of oar or paddle. The simple architecture of this craft was sufficient for the purposes of the natives, and indeed has continued to serve them to the present day; for the *balsa*, surmounted by small thatched huts or cabins, still supplies the most commodious means for the transportation of passengers and luggage on the streams and along the shores of this part of the South American continent.

"On coming alongside, Ruiz found several Indians, both men and women, on board, some with rich ornaments on their persons, besides several articles wrought with considerable skill in gold and silver, which they were carrying for purposes of traffic to the different places along the coast. But what most attracted his attention was the woollen cloth of which some of their dresses were made. It was of a fine texture, delicately embroidered with figures of birds and flowers, and dyed in brilliant colours. He also observed in the boat a pair of balances made to weigh the precious metals. His astonishment at these proofs of ingenuity and civilization, so much higher than anything he had ever seen in the country, was heightened by the intelligence which he collected from some of these Indians. Two of them had come from Tumbez, a Peruvian port, some degrees to the south; and they gave him to understand, that in their neighbourhood the fields were covered with large flocks of the animals from which the wool was obtained, and that gold and silver were almost as common as wood in the palaces of their monarch. The Spaniards listened greedily to reports which harmonized so well with their fond desires. Though half distrusting the exaggeration, Ruiz resolved to detain some of the Indians, including the natives of Tumbez, that they might repeat the wondrous tale to his commander, and at the same time, by learning the Castilian, might hereafter serve as interpreters with their countrymen."[1]

In his paper on "The earliest Spanish advances southward from Panama along the West Coast and South America", Murphy (1941) has revised and corrected certain geographical and chronological errors which in his opinion have dominated the literature on the subject. He claims that Andagoya and the few expeditions *before* Pizarro hardly pushed beyond the neck of the Isthmus, and that Ruiz' pioneering discovery of Ecuador took place early in 1527, rather than in 1526 as generally assumed.[1] Basing his report on various early chroniclers, including Xerés, Murphy (*Ibid.*, p. 17) writes:

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[1] Francisco Lopez de Gómara mentions in his *General History of the Indies* (1553, Part II, p. 12) that Francisco Pizarro, during his expedition in 1527, came across a raft with sail navigating in the open Pacific. He learnt of a land with gold and silver from two Indians he took as prisoners from this raft. This is apparently a reference to the same episode. Saamanos' original narrative of the meeting with the large balsa raft is referred to by many authors. It was reprinted by Saville (1910, Vol. II, p. 278) and quoted more or less fully by Gretzer (1914, p. 8), Brüning (1930, p. 368), Lothrop (1932, p. 235), Means (1932, pp. 19, 37; 1942, p. 18), Murphy (1941, p. 17), Hornell (1945, 1946 a, p. 50), Murra (1946, p. 804), Halldin (1950, p. 42), etc.

"After Bartolome Ruiz had passed Cape San Francisco, toward the end of February, 1527, he sighted near the equator a tall sail, which astonished his crew. The craft proved to be a rigged raft of balsa logs, of thirty tons burden. There was, in reality, nothing extraordinary about the size of the ocean-going craft, for Zárate decsribes balsas capable of transporting fifty men and three horses. The one encountered by Ruiz was manned by about twenty Indians, of whom eleven threw themselves into the sea, presumably to swim for shore rather than to drown, when the Spanish vessel bore down. The others were captured and considerately treated, and Ruiz ended by taking five of them into his ship (Sáamanos alone says only three; Xerés six), permitting the rest to proceed with the balsa.

"The Spaniards had no difficulty in recognizing this group as a new and superior order of Indians, totally different from the primitive people they had thus far met. They are described as 'rational,' well-clothed and as wearing jewels. Their craft, moreover, carried a cargo of textiles and other manufactured material. The three women, who were relatively fair-skinned, proved to be excellent seamstresses. They and the two young men, forced to accompany Ruiz to the San Juan, accepted their lot cheerfully, rapidly learned Spanish and were soon made to understand that they would be conveyed at an early date back to their own country. These five persons constituted the important nucleus of the 'friendly Indians' during the subsequent episode at the islands of Gallo and Gorgona. Before the end of the year, they were taken to Tumbes as accomplished interpreters, permitting Pizarro to open negotiations and even to carry on a long dialogue, which was searching on both sides, with an aristocratic *orejon* who was visiting Tumbes on a mission from Cuzco."

But before the Spaniards advanced as far south as to Tumbez in Peru, Ruiz had first turned near Cape Passado on the north part of the coast of Ecuador, and returned to Pizarro with the two captured Peruvian sailors and the three women on board his caravel. These captives, together with the looted cargo, gave the Spaniards the first material proof of the existence of the rich Inca Empire to the south, of which rumours were circulating in Panama and northern Colombia. Greatly encouraged by the good news, and equipped with new supplies from Panama, a small group[2] under Pizarro gradually pushed south again to begin what was to end as the strangest conquest of history. Murphy (*Ibid.*, p. 26) writes of this first European advance down the main coast of Ecuador: "Pizarro arrived off Santa Clara or El Muerto Island, in the Gulf of Guayaquil, where he landed. He was informed by the Peruvian Indians on board that he had reached the northern limits of their country. On this day and the following he overhauled five sailing balsas and opened favourable negotiations through the medium of his new proficient interpreters."

Prescott (1847, Vol. II, p. 248) thus summarized the reports of the chronicles on the progress from this island: "The place was uninhabited, but was recognized by the Indians on board as occasionally resorted to by the warlike people of the neighbouring isle of Puná, for purposes of sacrifice and worship. The Spaniards found on the spot a few bits of gold rudely wrought into various shapes, and probably designed as offerings to the Indian deity. Their hearts were cheered, as the natives assured them they would see an abundance of the same precious metal in their own city of Tumbez. The following morning they stood across the bay for this place. As they drew near, they beheld a town of considerable size, with many of the buildings apparently of stone and plaster, situated in the bosom of a fruitful meadow, which seemed to have been redeemed from the sterility of the surrounding country by careful and minute irrigation. When at some distance from shore, Pizarro saw standing towards him several large balsas, which were found to be filled with warriors going on an expedition against the island of Puná. Running alongside of the Indian flotilla, he invited some of the chiefs to come on board his vessel. The Peruvians gazed with wonder on every object which met their eyes, and especially on their own countrymen, whom they had little expected to meet there. The latter informed them in what manner they had fallen into the hands of the strangers, whom they described as a wonderful race of beings, that had come thither for no harm, but solely to be made acquainted with the country and its inhabitants. This account was confirmed by the Spanish commander, who persuaded the Indians to return in their balsas and report what they had learned to their townsmen, requesting them at the same time to provide his vessel with refreshments, as it was his desire to enter into a friendly intercourse with the natives.

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[1] Several earlier authorities have even placed the event in 1525.

[2] 28 Spaniards plus the captives, according to Murphy (*Ibid.*, p. 26).

"The people of Tumbez were gathered along the shore, and were gazing with unutterable amazement on the floating castle, which, now having dropped anchor, rode lazily at its moorings in their bay. They eagerly listened to the accounts of their countrymen, and instantly reported the affair to the *curaca* or ruler of the district, who, conceiving that the strangers must be beings of a superior order, prepared at once to comply with their request. It was not long before several balsas were seen steering for the vessel laden with bananas, plantains, yuca, Indian corn, sweetpotatoes, pine-apples, cocoa-nuts, and other rich products of the bountiful vale of Tumbez. Game and fish, also, were added, with a number of llamas, of which Pizarro had seen the rude drawings belonging to Balboa, but of which till now he had met with no living specimen. He examined this curious animal, the Peruvian sheep—or, as the Spaniards called it, the 'little camel' of the Indians—with much interest, greatly admiring the mixture of wool and hair which supplied the natives with the materials for their fabrics.

"At that time there happened to be at Tumbez an Inca noble, or *orejon*—for so, as I have already noticed, men of his rank were called by the Spaniards, from the huge ornaments of gold attached to their ears. He expressed great curiosity to see the wonderful strangers, and had, accordingly, come out with the balsas for the purpose. . . ."

The first meeting between Peruvians and Europeans was accordingly when the Spanish discoverers came across a thirty ton sail-carrying balsa raft northbound apparently en route to distant Colombia, Panama, or the Pearl Islands; and the first greeting the discoverers had when reaching Peru proper was a whole flotilla of balsa rafts standing out of the bay on a warlike expedition against the island of Puna, in the Gulf of Guayaquil, some 40 miles out to sea. None of the balsa rafts so far encountered were manned by fishermen, but by merchants and troops respectively, and women were not wanting on board. The five sailing balsas which Pizarro overhauled at sea near uninhabited Santa Clara Island might well have been on a deep-sea fishing trip, but this is not specified.

After this great discovery Pizarro returned to Panama in 1528, and then to Spain to secure royal consent to his occupation of the newly discovered country. In 1530 he sailed down the Pacific coast again with just over 150 soldiers, including three of his brothers and his cousin Pedro. The latter, Pedro Pizarro (1571) has left us some interesting details of these early voyages. He first says of his cousin Francisco's earlier journey, in which he did not himself participate (1571 b, p. 138):

"...and they went on down the coast in order to discover what there was beyond. And thereby was our Lord served, for they came upon good land, for they encountered the province of Puerto Viejo, and from there they went to the port of Tumbez, and they passed a little further down the coast where they got news of this land, although not of all that was later found and discovered. They saw some ewes which the people gave them, and aboard some balsas which they overtook upon the sea there were girdles of mother-of-pearl, of gold and of silver, as well as some of the clothes which they wore in that country, all of which they kept in order to take it to Spain to show to His Majesty. And likewise there were three or four boys, Indians of the land, whom they captured aboard the balsas, as well as some others whom the Indians gave them to eat, thinking that the Spaniards were eaters of human flesh."

Pedro Pizarro also, upon his own arrival, had interesting experiences with balsa rafts, all during the first days of the conquest, before the capture of Tumbez in 1531. We learn from him how the highland Cuzco Incas controlled Puna Island from the sea, as well as the coastal area of Puerto Viejo in Ecuador, whence, it will be recalled, Tici Viracocha was remembered as having departed by sea.

Pizarro (*Ibid.*, p. 154) says of Puna Island: "Also there was in this island an Inga, one of those of Cuzco, who governed Puerto Viejo and the island and Tumbez for the Inga, and as soon as the Spaniards arrived he disappeared and went away without informing himself of anything." We now learn from Pizarro that while the newly arrived Spaniards were at Puna Island, they split company, some going on in their own caravels. We read (*Ibid.*, p. 157): "...the rest of the men embarked on some balsas which were then with us, and which belonged to the people of Tumbez, who offered to carry some Spaniards and baggage upon them. Their purpose was treason as later appeared, for after we had left the island the balsas carrying some troops and other things, as I have said, put ashore on some small islands which they (the Indians) knew. They made the Spaniards go ashore there to sleep, and when they believed them to be asleep, they went away, taking the balsas with them, and later they returned with more (Indian) troops and killed those (Spaniards) whom they had left there."

Pizarro adds that the same tragedy would have befallen himself as well as Francisco Pizarro's brother and Alonso de Mesa "if it had not been for the fact that Alonso de Mesa was very sick with berrugas and so did not wish to get off the balsa and (sleep) on the islet... While we were thus sleeping, at midnight the Indians pulled up the stone tied with a rope which they throw into the sea to serve as an anchor. Believing that Mesa was sleeping, they intended to go away, leaving us there and killing Mesa later. And, as I have said, the berrugas gave Mesa great pain, and he was awake, and, when he saw what the Indians were doing, he gave great shouts which awakened Francisco Martin and me, and when we understood the evil they (the Indians) planned, we bound the chief and the two other Indians, and so we were on the watch all night. And the next day we set out thence and arrived at the coast of Tumbez, and the Indians, now that we were in the surf, threw themselves into the water and dragged us into the waves which cast us up upon the shore very wet and half drowned, and the Indians, seeing that we were now on shore, pushed the balsa off into the waves; then they took it and went off with it, carrying with them everything which we were bringing with us. At last they left us with only what we wore upon our backs, and so they robbed many who had put their belongings upon the balsas believing that the Indians would carry them safely; among (those who did so) were captain Soto and others."

Inca Garcilasso and Cieza de Leon both supply evidence of similar tactics being used by the maritime coast Indians against the Incas even before the discovery of Peru by the Spaniards.

Thus, when the pre-Spanish Inca Huayna Ccapac of Peru subdued the maritime districts of southern Ecuador, the people on Puna were also engaged in war with those of Tumbez. The Inca sent for the chief of the Puna islanders, Tumbala, and demanded his submission. Tumbala complied, and Inca troops, with leaders of royal blood, were established on Puna, also officials who were to organize the island district, and then the Inca departed. But Tumbala devised a cunning plan to murder the foreign intruders. The Inca had left instructions that the main portion of the island garrison was later to join him on the mainland of Ecuador, and should be conveyed by balsa rafts to a certain spot at the mouth of the Guayaquil river. The convoy of rafts started according to plan, but when at some distance into the open sea, the islanders cut the ropes which held the logs of the rafts together, and pushed the Peruvian soldiers into the sea. Cieza[1] says: "If any that knew how to swim tried to save their lives, they were killed by fierce and cruel blows, and if they dived, and thus tried to fly from their enemies by seeking favour of the fishes that dwell in the depths of the sea, it was of no avail, for the islanders, who live much in the sea employed in their fisheries, swim as well as the fishes, and easily overtook the fugitives and strangled them."

The Inca exacted a terrible vengeance on the islanders, and imposed as punishment an ordinance which was still observed at the time of the Spanish conquest.

We may give also Inca Garcilasso's[2] version of the same event:

"The natives were ordered to convey the Ynca captains by sea in their *balsas* as far as the mouth of a river, where they were to land, in order to fulfil their instructions. Having made these arrangements, the Ynca returned to Tumpiz, ... The captains, as soon as the King had departed from the island, prepared to go where he had ordered them. They gave directions for *balsas* to be got ready for them, to cross that arm of the sea. The Curacas, who had conspired together, seeing that this was a good opportunity for practising their treachery, would not bring all the *balsas* they could, but resolved to convey the captains in two voyages, so that they might more easily execute their plan, which was to kill them on the sea. Half the captains and their followers embarked, all being chosen men. They were handsomely dressed as men whose duties were near the royal person, and all were Yncas, either by blood or by privilege of the first Ynca. When they reached a certain point on the sea, where the natives had resolved to perpetrate their treason, they cut the ropes by which the poles of the *balsa* were fastened together, and cast all the captains and people, who were quite off their guard, into the water. Then the native sailors, with the oars and with the betrayed people's own arms, which were thus turned against their owners, killed them all, without leaving one alive, although the Yncas began to swim in the hope of saving their lives. The Indians generally know how to swim, but this did not avail them; for those of the coast, being so used to the sea, had the same advantage over the inland Indians as marine animals have over those which live on the land. Thus the islanders remained with the victory, and they enjoyed the spoils, which were rich and numerous. They joyfully saluted each other from *balsa* to *balsa*, and wished each other joy of their deed, thinking, like a rude and barbarous race as they were, that not only were they free from the power of the Ynca, but that they were strong enough to deprive him of his empire. Full of this presumptuous vanity, they returned, with all possible dissimulation, for the other captains and soldiers who had remained on the island, took them on board, and killed them in the same place and in the same way as they had killed their companions."

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[1] English translation by Joyce (1912, p. 57).

[2] English translation by Markham (1869–71, p. 432).

We learn from Xerés (1534, p. 7), who also took part in the final advance into Peru in 1530—31, that the Spaniards were received in a friendly manner by the Indians when they first arrived. He says of the aboriginal coast of Ecuador: "In this land there were abundant supplies, and the people led well-ordered lives, the villages having their streets and squares. One village had more than three thousand houses, and others were smaller." Inland from the aboriginal coastal town of Atacames 90 Spaniards in search of loot suddenly ran into an army of "more than ten thousand Indian warriors... but seeing that the Christians intended no evil, and did not wish to take their goods, but rather to treat them peacefully with much love, the Indians desisted from war." The mariners of these parts also assisted the Spaniards to cross from Ecuador over to Puna Island (*Ibid.*, p. 13): "It is two leagues from the main land, and, being populous, and rich, and yielding abundant supplies, the Governor [Pizarro] crossed over to it in two ships, and in *balsas* of wood which the Indians make, on which the horses were carried over." Xerés (*Ibid.*, p. 16) also speaks of certain Spanish messengers with a supply of cloths, who on this second visit were sent in advance from Puna to Tumbez as passengers on some native balsa rafts. The Spanish caravels which followed the rafts took three days for the crossing, which was made against the locally dominant wind and current. When they arrived in Tumbez they learnt from some captured local Indians that some of their kinsmen "had risen and seized the Christians and cloths that came in the *balsas*." Pizarro's men in return looted the town of all the provisions they could find, which also were conveniently loaded on board two local balsa rafts. ...

The treasure and information which came into the possession of the Spaniards when they captured the first local merchant craft, and the experiences that befell some of them when they employed Peruvian balsa rafts and native seamen for local navigation, often with their horses on board, led to many other contemporary Spanish comments on these vessels. We shall soon see that Zárate (1555) also refers to the native practice of cutting the ropes on the rafts to dispose of undesired passengers, but for the sake of chronology we may first include a few words on Andagoya.

Andagoya's reference to balsa rafts from the time of the conquest

Pascual de Andagoya went to the newly discovered Panama Isthmus in 1514, whence he took part in the earliest explorations down the Pacific coast. He is referred to as "the pioneer of the discovery of Peru",[1] for he was supposed to have obtained (in 1522) from the coastal tribes of Biru, near the northern border of the present Colombia, authentic information respecting the Inca Empire, and it was his report that led to the expeditions of Pizarro and Ruiz. Andagoya (1541—46, p. 41) himself says of this experience: "In this province I received accounts both from the chiefs and from merchants and interpreters, concerning all the coast, and everything that has since been discovered, as far as Cuzco; especially with regard to the inhabitants of each province, for in their trading these people extend their wanderings over many lands."

Andagoya does not specify by what means of transportation the aboriginal Biru merchants carried on their trading and acquired their knowledge of the Inca Empire, but we can safely assume that it was either by their own coastal craft or by visiting merchants coming from Peru and Ecuador. The mangrove swamps hampered all other means of long distance coastal communication. We may also note that Andagoya carried out much of his local exploration not in caravels, but by canoe,[2] and that the main river or channel in the Biru district was named Rio de la Balsa by the arriving Spaniards, either in honour of the local trees or the local craft. But we are more interested in the means of navigation further down the continent, where the coastal population of Tumbez and Payta in Peru were so accustumed to voyaging along the coast for trade among foreign tribes, that they assumed the arriving party of *viracochas* had come for the same purpose. Andagoya (*Ibid.*, p. 45) says: "The Indians, seeing that the Spaniards were so few in number, did not fear them nor desire to injure them, thinking that they were merchants."

Describing the rainy climate of the northern section of the Inca Empire, from San Miguel in North Peru (south of Tumbez) to Puerto Viejo in northern Ecuador, Andagoya (*Ibid.*, p. 58) says of the local aborigines: "They go to sea to fish, and navigate along the coast in *balsas* made of light poles, which are so strong that the sea has much ado to break them. They carry horses and many people, and are navigated with sails, like ships."

The same chronicler tells us how the native merchants in places along this coast find great salt deposits which they cut out in blocks of excellent quality and remove for trade, and he also speaks of a certain fountain[3] forming a little lake of a rosin like tar, where "the ships which pass by take quantities on board, and with it they tar the ropes and the ship's sides." He says nothing to indicate that the Indians also did this. But in another place, when speaking of the aborigines of Pacific Central America, he refers to the *nequen* or *hennequen* already described from the rigging of the balsa raft captured by Ruiz. Andagoya (*Ibid.*, p. 36) says of this: "The inhabitants have a manufactory where they make cordage of a sort of *nequen*, which is like carded flax; the cord is beautiful, and stronger than that of Spain, and their cotton canvas is excellent."

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[1] By Markham (1865, p. 42). The same authority says: "The personal narrative of such an eye witness of some of the leading events which led to the discovery and conquest of Peru, is certainly a most valuable addition to our knowledge of those stirring times."

[2] By falling overboard from his canoe Andagoya acquired a disease which lasted three years, for which reason Pizarro and his partners were given the task of following up his discoveries.

[3] Probably at Santa Elena Peninsula west of Guayaquil.

Zárate's description of balsa rafts in the decades of the conquest

Augustin de Zárate came to Peru as royal treasurer in 1543, earlier than, for instance, Cieza. He left Peru again before 1554, and his observations are limited to the generation of the Conquest. He did not know the local languages, but is noted for his excellent descriptions of roads, sites and cultural peculiarities. Zárate (1555, Bk. I, Ch. vi) says of the aborigines whom he saw in Tumbez, the first Peruvian port to be visited by Pizarro also:

"They own many rafts on which they sailed. These rafts are made of some long and light logs tied over two other logs, and those on top are an odd number, usually five and sometimes seven or nine. The one in the middle is longer than the others, like the pole of a cart, and here the one who steers is seated, in such a way that the balsa has the form of an outstretched hand with its fingers narrowing to the sides. On the top of this they make a platform so as not to get wet. There are balsa rafts which can carry fifty men and three horses. They navigate with sail and with paddles because the Indians are themselves great mariners [*grandes marineros*].

"Sometimes when Spaniards have voyaged on the balsa rafts it has happened that the Indians have very cunningly detached the logs, by unfastening each one from its ropes, and in this way the Christians perish while the Indians save themselves on top of the logs, and even without any support, because they are great swimmers."

The same early chronicler included some fragmentary myths current among the Ecuadorian aborigines at Puerto Viejo. According to the Puerto Viejo Indians, their ancestors had in very ancient times been visited by a race of giants who had settled in that area. Zárate (*Ibid.*, Ch. V) was thus informed about the giants:

"They say that they ate the same meat as the Indians, and especially fish, for they were great fishermen. They went fishing on flat rafts, each giant on his own raft as it could not support more than one, although this craft can carry three horses each: they waded on foot into the ocean to a depth of two and a half fathoms, and liked best to catch the tiburons and other great fish because they then found more to eat..." According to Zárate's informants these maritime giants went about nude and were cruel to the Indians, but they were finally driven away by a semi-human deity who descended among them from the sky, resplendent as the sun. We, like the early Spaniards, can only speculate as to the origin of these tales, current just in the area where the Inca, in a less fabulous manner, placed the assembling-place and departure of the early viracochas. Zárate and his Spanish contemporaries were so impressed by the natives' insistence on the truth of these stories that, when they found in the near vicinity some large teeth and bones of an extinct local mastodon, they thought they had discovered vestiges of the Puerto Viejo giants. (See also Uhle 1930.)

Oviedo's reference to balsa rafts at the time of the conquest

Gonzalo Fernando de Oviedo y Valdes was born in Spain about 1478, and died in 1557. He resided for 34 years in America, and was at Panama when Pizarro fitted out his southbound expedition. He is recognized as one of the most reliable historians on aboriginal life in America at the time of the Spanish discoveries. In his early history, written in the first few years of European acquaintance with Peru, Oviedo (1535–48, Vol. IV, Bk. XLVI, Ch. xvii) includes a brief description of the native balsa raft as first tried out by Europeans when the Spaniards were lured out to visit the chief of Puna Island:

"...the lord of this island came in peace to the governor, Francisco Pizarro, and he brought all his people and horses from the mainland to the island on balsa rafts; it is a legua in distance [from Ecuador], and so they use these balsa rafts, which can carry up to two or three horses at sea. They are made of some large and light logs floored like rafters, with others athwart for tiers. Their cooking places are in the centre, and they have latin sails (*velas latinas*), and oarsmen at the sides with their paddles."

Las Casas' reference to sail-carrying balsa rafts in prehistoric Peru

Bartolomé de Las Casas was born in Seville in 1474 and was educated in law and theology. In 1498 he and his father accompanied Columbus on his visit to the West Indies, and in 1502 he came back again to settle in the New World, where he finally became Bishop of Chiapas, Mexico. He apparently visited Peru as early as in 1532, just when Pizarro was completing the conquest and while Peruvian material culture was still as in its prehistoric phase. He died in 1566. Through his extensive studies and writings he became one of the principle chroniclers of the period of the conquest.[1] Some time before 1559, Las Casas (ca. 1559, Chap. XLI, pp. 78, 79) wrote down some of the interesting information which Nuñez de Balboa had received from the natives on the Panama isthmus.

We learn that in 1512, before the Spaniards had yet seen the Pacific Ocean, some of them were weighing pieces of gold obtained in the district of the great chief Comogre on the Panama Isthmus, when they began to quarrel between themselves about the division of the largest and best worked pieces. When the oldest son of chief Comogre saw this, he grasped the scales and threw a handful of the gold on the floor, saying (*Ibid.*, p. 78): "What is this, Christians? Do you quarrel for so little? If you desire gold so much that you disturb and molest the peaceful people of this country and take all the trouble to emigrate from your own homes, then I shall show you a place where you can fulfill your desires. But for this it will be necessary for you to be more numerous than you are now, because you will get in trouble with great kings who defend their lands with much courage and rigour, ... and he pointed then with his finger in the direction of the Pacific Ocean, which is towards the south, and said that they would see it [the ocean] when they had passed certain mountain-ranges; and (he said) that other peoples navigated there with ships or craft [*navíos ó barcos*] a little smaller than ours, using sails and paddles. When this ocean was traversed (the Spaniards) would find great riches of gold, and there were great vases of gold from which the people ate and drank, ... and he gave much news concerning the peoples and riches of Perú, and the balsa rafts in which they navigated with paddles and with sails [*con remos y con velas*]."

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[1] See Helps' monograph on Las Casas (1890).

Las Casas (*Ibid.*, Chap. XLIX, p. 118) further states from Panama that another chief, Tumaco, later pointed along the Pacific coast in the direction of Peru, stating that, besides gold, there were also "great quantities of certain animals on which the people loaded their cargo, and he made a figure of clay like the sheep of that land, with neck like a camel; ... and this was the second information which Vasco Nuñes obtained concerning the riches and the country of Perú." Animals of burden were unknown among the high-cultures of Mexico and Central America, and as Las Casas logically inferred, the Panama chief knew the existence of the llamas in Peru. This, and the reference to the sail-carrying balsa rafts, seem to constitute fair evidence of at least a casual two-way maritime contact between Panama and aboriginal Peru.

Benzoni's balsa raft

Girolamo Benzoni was an Italian who travelled in the Spanish possessions of the New World, including Peru, for some years between 1540 and 1556. His *History of the New World* was originally published in 1565, and is of value mainly because of a series of primitive sketches illustrating the book. Although these drawings are both primitive and inaccurate, they are still often of value, as Means (1921, p. 87) points out, in showing in their own way technological methods and other impressions of the early artist. Through Benzoni (1565) we get the first historic illustration of a balsa raft. (Plate LXV.)

Benzoni's drawing, which was captioned "Method of fishing and navigating in the South Sea", shows the two types of Peruvian log-rafts adapted respectively to fishing and navigation. In the background we see two fishermen in action, each sitting astride three logs lashed together to form what the Spaniards described as a *caballito* ("little horse" or "rocking-horse"), with a fish-net stretched between them. This was the most common form of fishing-craft along great stretches of the coast. In the treeless areas further to the south the logs were generally replaced by bundles of *totora*-reeds lashed together in a similar fashion. But even as far down as in Chile the three-log *caballito* was a favoured one-man fishing craft. According to Garcilasso (1609 b, Vol I, p. 261) and other chroniclers, the coastal fishermen could neither adapt their knowledge of sails nor of regular one-side paddles to these crank *caballitos*, which they propelled by hand or, for longer distances, by a piece of split bamboo held transversedly across the raft, or even a double-bladed paddle similar to that used on an Eskimo kayak.

The regular balsa rafts used for trade and navigation, however, were of different shape and dimensions, and had to be propelled by different means. Such a craft, intended for navigation rather than for mere coastwise fishing, is represented in the foreground. This raft shows *seven* parallel logs connected by cross beams, and is thus of less than average size. Since Benzoni in his own text shows that larger rafts existed which were composed of nine or even eleven parallel logs and carried sails of proportionate size, this would increase the mere *width* of the raft he has drawn by more than 50 per cent, and the total deck space would then be more than doubled. Benzoni's seven-log raft has a crew of eight. Eleven or possibly thirteen logs would have been needed for the largest of the recorded trading-balsas, such as Ruiz met, with a crew of twenty and a carrying capacity of thirty tons. Nor would Benzoni's seven-log raft have had room for fifty men or three horses, although it would support a most substantial weight. Benzoni's drawing shows a crew consisting of three paddlers on each side, a steersman and probably a captain. Although his drawing of the masts and sail is very crude, we may still appreciate his attempt to draw, probably from memory, a square sail suspended in front of two sheers representing a bipod mast. Minor details like sheets and lashings are not included, probably because they would unavoidably have confused the primitive lines of the drawing, but they must have been present to prevent the masts and sail from being blown down, or the raft from breaking up. Whether the central box represents cargo or a platform for food or cooking may be difficult to determine. We note how the central log projects at both ends, and that the lenghts of the logs are so arranged as to decrease towards both sides at the bow, Benzoni's raft seems to be composed of curved logs selected so as to bend out of the water at the bow.

In his text, Benzoni (*loc.cit.*, p. 242) merely says of the Indians along the coast of the northern provinces of Peru and Ecuador:

"All along this coast the Indians are great fishermen. The boats they use are a kind of raft, both for fishing and navigating, consisting of three, five, seven, nine, or even eleven timbers, forming a sort of hand [*a modo d'una mano*], with the longest in the middle. They are made of various lengths, and thus they carry sails according to their size; and a proportionate number of rowers. When they are becalmed at sea, they throw bread, fruit, and other things overboard as a sacrifice, praying for a fair wind, they being too tired to row any more."

The latter remark should give us ample cause for reflection. In view of the local current we may well appreciate what might happen to drifting South American balsa rafts, in the course of generations, if such sacrifices to the weather-gods should happen to be of no avail.

W. H. Smyth, an English rear-admiral who translated Benzoni's history for the Hakluyt Society in 1857, wrote in a footnote to Benzoni's description of these craft: "Every country seems to contrive embarcations adapted to locality. So with the rafts or *balzas*, here mentioned, which are admirably contrived for their duty. We used some of them which we took in 1807, and found them made as Benzoni states, of logs of trees lashed together—catamaran fashion—with *bejuccas* (lianas), or ropes made of ox-hide thongs. The larger balzas carry sails on masts resembling sheers; and they are steered by raising or lowering, as the occasion may require, some boards which enter vertically between the timbers at either end of this rude, but ingenious, floating vehicle."

Sarmiento's and Balboa's independent versions of highland Indians employing balsa rafts for Pacific explorations

Pedro Sarmiento de Gamboa, who came to South America during the first generation of the Conquest, and devoted seven years to the local study of the pre-Spanish history of Peru, differed from the great majority of the chroniclers in being an experienced navigator who took an interest not only in the inland conquests of the Incas, but also in their ocean lore. As we shall see later, the result of his enquiries, published in 1572, included highly interesting information on the prehistoric uses of balsa rafts in Peru. Not only do we learn through Sarmiento that the balsa rafts in Peru before the coming of the Spaniards were navigated with sails, and were used by merchants and coastal warriors, but even that on a certain occasion one of the highland Incas marched down to the coast with his army and had a great number of balsa rafts built, on which the Cuzco emperor and his highlanders undertook direct voyages of exploration, searching for rumoured islands far out in the Pacific.

Miguel Cabello de Balboa will also be mentioned later. He came to Peru in 1566. In his *History of Peru* (1586, p. 81) he also shows how the same Cuzco Inca in pre-Spanish time descended to the coast to explore the ocean with balsa rafts. Balboa describes these rafts as "of the kind the natives of these coasts make use of." They are made "from logs of a very light wood strongly attached and covered with reed-cane. The Spaniards have given them the name *Balsas*."[1]

Garcilasso's distinction between coastal reed-boats and ocean-going log-rafts of aboriginal Peru

Inca Garcilasso needs no further introduction. Born and brought up among his Inca relatives in Cuzco, he left his native land for Spain in 1560. In his *Royal Commentaries* (Vol I, Bk. III, Ch. XVI) Garcilasso concentrates on the history of the highland Incas, and he goes into great detail as to the aboriginal Peruvian water-craft only when describing his own experiences in crossing the great inland rivers. But all the floats and craft described by him confirm the Peruvian preference for 'unsinkable' craft, craft that will float and keep on the surface of the water under all circumstances for a desired period. He thus describes, chiefly for inland water transport, reed-bundle boats, bamboo rafts, rafts of air-filled calabashes held together in large nets, and similar floats composed of an assembly of other buoyant objects. In other words, the principle is not that of our concave hull, which can fill and sink, but rather that of magnified and elaborated life-buoy.

About the coastal population of Peru Garcilasso[2] adds: "The Indians along the coast of Peru embark on the sea to fish in the small boats we have already described [reed-boats]. They go from four to six leagues off the land [15 to 24 English miles], and more if it is necessary, for that sea is generally smooth, and admits the use of such frail barks. *When they want to convey large cargoes they use the rafts of wood.* . . . They do not put up sails on their boats of rushes, for they have no supports to hoist them on, nor do I believe that they would go so fast with them as with their oars; *but they hoist sails on their wooden rafts when they navigate the sea.* These contrivances of the Indians of Peru, for navigating the sea and crossing large rivers, were in use when I left the country [1560] and probably are so now, for those people, being so poor, do not aspire to better things than they already possess."

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[1] The origin of the term *balsa* for rafts is somewhat obscure. The noted historian of Peru, Means (1942, p. 19 fn.), says: "The word *balsa* is neither Quechua nor Colla. It probably comes from one of the local tongues spoken around the Gulf of Guayaquil. Primarily, it indicates the *balsa* tree and its wood, meaning raft only by extension of the original meaning." We may note that *dalca* is the aboriginal term for 'boat' or 'canoe' on the coast of Chile; whereas *vaka* is a general term for 'boat' or 'canoe' in Polynesia.

[2] Markham's translation (1869–71, Vol. I, p. 261), italics by T. H.

Garcilasso mentions in the same connection how the Peruvian raftsmen went fishing in the deep sea with harpoons, catching fish "as large as men", and he describes lively fishing scenes where the great wounded fish fly through the air like birds.

We could hardly get more authentic information than that offered us by Garcilasso, when it comes to distinguishing between the coast-bound reed-boats and the ocean-going log-rafts, both found along the aboriginal coasts of Peru. We learn from the same early authority that the reed-boats, without sail, went fishing at a distance further from the open mainland coast than would have seemed safe to modern Europeans in their open boats. The fact that they paddled their reed-craft twenty miles from land, and that the limit of six leguas was exceeded when the fishermen found it necessary, takes these vessels right out to the eddies and edges of the main Humboldt Current, which is temptingly rich in fish owing to the density of plankton which follows the moving water-masses. And *outside* the scope of these primitive reed-boats, we learn of sturdy wooden rafts which hoist sails and "navigate the sea". These, as opposed to the average fishing vessel, are specifically designed for the purpose of conveying "large cargoes".

In another place (Bk. VII, Ch. XIV) Garcilasso states that log-rafts were also occasionally built inland by the early Incas to carry troops and all their provisions on the large rivers. We learn in this connection that these same rafts "had the capacity of holding thirty, forty, or fifty Indians each, more or less. The food was carried on a platform in the middle of each balsa, half a yard [*medio vara*] high, that it might not get wet."

Spilbergen's drawing of balsa raft from Peru

In his early voyage round the world between 1614 and 1617, Joris van Spilbergen made a brief call at Payta harbour, some 120 miles south of Tumbez in Peru. Although not ordinarily classed as an authority on early Peru, Spilbergen happened to have his fleet supplied with fish from an incoming Peruvian balsa raft, and he was sufficiently impressed by the nature of this extraordinary vessel to leave us with a drawing of it. Although as primitive and casual as Benzoni's sketch, there are still certain highly interesting details pertaining to Spilbergen's balsa raft, which is here reproduced in Plate LXVII.

A crew of five is included in Spilbergen's drawing. Two men seem to be in charge of the sails, and three others are sitting on deck, raising or lowering centre-boards between the logs, these seem to be the only means of steering their craft. We shall see later that these centre-boards were used in Peru before such an invention had been introduced to Europe. We can also distinguish on deck four large water-jars, and three objects which look like millstones or grindstones, probably representing the stone anchors which were thus described by Sáamanos in 1526. The triangular sails drawn by Spilbergen have caused comment by several modern writers on the existence of triangular as well as square sails in aboriginal Peru. Until we have more corroborative evidence, the triangular sails on Spilbergen's balsa raft seem to stand alone, and may possibly represent a late acquisition, or a lapse of memory if the artist made his drawing upon return to Europe. We shall see elsewhere that the original square sail of the balsa rafts survived in both Ecuador and Peru until the craft itself went out of use at the opening of the present century, whereas the triangular sail is found on the seagoing rafts of Brazil.

Spilbergen's text to his own drawing (see also Speilbergen 1614—17) is: "[Pl. LXVII] is one of the savages' vessels, called *Balsem.* Here they have fish aboard, and they can sail swiftly with these vessels in the wind." We further find the following entry on the same episode in his book (*Ibid.*, p. 83): "In the afternoon, a fisherman came in from the sea, to whom Jan de Wit was immediately sent with his little vessel, and, returning in the evening, he brought the same fisherman with him, the latter having a boat and sails very wonderfully made, and in it were Indians, all young, strong, and robust men; they had been out fishing for two months, which was distributed amongst the fleet." In the same connection Spilbergen speaks of the excellence of Payta harbour, but of the strong and constant currents that flow along the coast outside this bay.

The balsa raft which came in from the sea after a two months' fishing trip, and with a catch sufficient for distribution among Spilbergen's fleet, could not have been anywhere else than out in the strong Niño and Humboldt Currents. Indians who thus left their harbour to go away by raft for many weeks must be exceedingly good mariners to fight their way across the currents and back to their base.

Cobo's distinction between reed-boats and log-rafts in aboriginal Peru

With Bernabé Cobo we return again to the well-known chroniclers of early Peru. Born in Spain in 1582, Cobo was 17 years old when he came to Peru at the turn of the century of the conquest. He was therefore not present in the earliest decades of contact, but he still arrived in time to give an interesting description of the native methods of boat-construction. In his chapter on navigation, Cobo (1653, Ch. XIV, p. 218) distinguishes between the two basic principles of boat-building, both known and practised by the aborigines of Peru. He first lists such craft as "those with outer edges and concave shape, which are hollow inside," and says "all the others which are used are types of balsas, of which there are many different kinds." The first category is represented by dug-out canoes, "which are as large as the trunk from which they are carved will permit it; some are so large that they measure up to fifty or sixty feet in length, and so wide that they have room for a pipe of wine crosswise; others again are so small that they can carry no more cargo than two persons. They navigate with sail and paddle or are pushed forward with stakes; they permit only the use of a small sail, which generally is of cotton."

This type of water craft was known in many parts of the Inca Empire (see also Lothrop 1932, p. 231), principally on the large rivers, but it was never much esteemed for navigating at sea.[1] Cobo (*Ibid.*, p. 218) then goes on to describe the various types of balsas: "Where good timber for balsas is lacking, the Indians make them of other materials, which seem quite unsuitable for such a purpose. The most common ones in the Kingdom are made from dry reedstalks or other kinds of rushes,..." He begins by describing these reed-boats, and we learn of the manufacture of the very same type of craft as has survived on Lake Titicaca until the present day. We shall return later to this interesting craft. We learn from Cobo that the smallest specimens are made from a single bundle of buoyant reeds, about eight feet long and scarcely a fathom in circumference, but that the largest reed-boats are composed of several such bundles lashed together until they become from fifteen to twenty feet long and ten or twelve feet thick. The former can only carry one or two persons, but the latter can sometimes carry twelve, and, says Cobo, by lashing two large reed-boats side by side the Indians construct a craft capable even of transporting Spanish horses and cattle. Stating that even small reed-boats are used not only on lakes and rivers but also on the ocean, Cobo adds that they are propelled by a piece of split bamboo which is grasped in the middle and serves as a double-bladed paddle. They are too light, and capsize too easily, to permit of sails. We may indeed appreciate that the coastal population had no dread of the ocean in front of them, when we read:

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[1] The same early chronicler also describes the plank boats (*dalcas*) used in southern Chile.

"The Indian fishermen of the Peruvian coast proceed from four to six leguas [15 to 24 miles] into the ocean on tiny balsas, which are so small that when they leave their houses, each one carries his own raft on his back down to the ocean coast, and placing it in the water he mounts it. Sitting in the middle, and with strange lightness, twenty, forty or more Indians go together, each one on his own raft, and these, when seen from a distance, resemble great fishes more than vessels. ... By alternately pressing each end of the bamboo paddle into the water on each side, they shoot the small rafts forward with such a speed that they go over the water like birds; indeed, with the least sea that rises the fishermen and their equipment get well drenched, because the surface of the raft does not rise more than a palm above the water."

We next hear of the strange pontoon-like craft: "Not so unlike these in form, although of different material, are some other rafts which are used by the Indians in the province of *Arica*. They are made of two seal-hides filled with air, which are attached one to the other in the same manner as is done with the two bundles from which the reed-rafts are made. Each carries only one Indian, and he goes as far out into the ocean to fish as with the reed-boat. Because these rafts grow slack in the water and shrink, to avoid sinking each Indian brings with him a section of cane, and in the middle of the ocean he manages from time to time to untie the bags and refill them by blowing, as if they were balls filled with air. They are as light and swift in the water as the material of which they are composed, which is air. One does not hoist sail on them, nor is this done on those of reed, and they are only propelled by paddles, like the former."

Finally we learn about the third and most seaworthy craft of early Peru, the log-raft. Cobo has a special chapter entitled "Of the balsa timber" (Ch. CXXIV, p. 122, *Del Palo de balsa*), in which he says: "Even if some woods are esteemed for being hard and heavy, one does not therefore depreciate those which are soft and light, since different qualities are required for different purposes; and such is what in these lands is called *balsa* timber, because one makes of them good balsas. The tree is large, and in some places it grows greater than the largest walnut tree; ... Its wood is so soft and spongy that when one cuts into this tree, the whole axe disappears into the trunk. In many parts of this kingdom this timber, when dry, is used for making balsa rafts to navigate on the ocean and on the rivers; because the wood is so light, these rafts are very swift."[1]

Cobo (*Ibid.*, p. 221) adds: "The largest rafts used by the Peruvian Indians living near the forests, like those of the harbours of Payta, Manta, and Guayaquil, are composed of seven, nine, or more logs of balsa timber, in the following manner: The logs are lashed one to the other lengthwise by means of *bejucos* [lianas] or ropes tied over other logs which lie as cross-beams; the log in the middle is longer than the others at the bow, and one by one they are shorter the closer they are placed to the sides, in such a way that, at the bow, they get the same form and proportions as seen on the fingers of an extended hand, although the stern is even. On top of this they place a platform, so that the people and the clothing on board shall not get wet from the water which comes up in the cracks between the large timbers. These rafts navigate on the ocean by means of sail and paddles, and some are so large that they are easily able to carry fifty men."

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[1] Although the whole axe will disappear into a dry log, the present author found the balsa tree, when growing, to give way to the axe only as cork would give way to a very blunt knife. He also found it possible, not to say preferable, to build the raft of green and freshly cut logs, with sap intact. There is, also, a considerable difference in the degree of hardness between individual balsa trees.

The safety of these craft seems to be threatened more from the hands of man than from nature, for Cobo adds: "The danger with these embarcations is that they are very suitable for the planning by the Indians of some treason, because they could execute it unexpectedly by cunningly untying the logs and dissolving the composition of the raft; and being great swimmers, impeded by little or no clothing, they escape by swimming, while those who cannot swim perish by drowning."

Peruvians transported balsa logs for building rafts far away from balsa forests

Balsa timber was only accessible to the Peruvians in the northern coastal or eastern inland sections of their empire. In the coastal area the balsa tree, *Ochroma lagopus* (or *O. piscatoria*), grew in the northern part of Peru proper and in Ecuador, and from there on northwards to Central America. This distribution of the growing tree does not set a limit to the ethnographic distribution and mobility of balsa-log rafts. The principal pre-Columbian use of the balsa tree was to afford a means of coastal travel and transportation, and for this reason balsa rafts were found far from the forests where the timber was originally cut. Balsa logs were even carried overland for considerable distances to supply building material for balsa rafts. As already pointed out by Friederici (1907, p. 23), balsa-log rafts—which he says: "were the most seaworthy vessels of the old Peruvians, went under sail and undertook considerable trading voyages"—did not only navigate the whole Peruvian desert coast, but "they were even used in the interior; some Incas had building material made available in the inland and built themselves balsa rafts for enjoyment and display on the lakes." He mentions how log-rafts were also used by the Chibchas on their highland lakes near Bogotá. But more interesting is the fact that balsa logs were carried to the barren coasts of Lake Titicaca. This information was originally recorded by Vicente Valverde in his manuscript on the unrest which followed the original conquest of Peru between 1535 and 1539; this was published in Madrid in 1879. Valverde (*Ibid.*, p. 179) describes how the arriving Spaniards found a bridge composed of reed-rafts spanning the entire river Desaguadero where it joins the southern end of Lake Titicaca. When the Spaniards under Diego de Rojas encamped on the west bank of the river they destroyed the bridge as a safety measure. Therefore, when Hernando Pizarro came with troops to suppress the natives on the other side, he was at first unable to get his horses and men across the wide river. But this difficulty was overcome:

"After he [Hernando Pizarro] had arrived at the outlet of the lake, he had rafts constructed, since he found there a light kind of timber which is suitable for that purpose, and which Guaiana-caba [Huayna Capac], the father and predecessor of the two ruling Incas, had made the Indians carry on their shoulders a distance of 300 leguas [1 200 miles] to that place, to build balsa rafts which he went on board for recreation on this lake [Titicaca] during his festivals. Of this kind of wood they made a big raft on which Hernando Pizarro embarked with as many as fifteen or twenty [armoured] men, and as many were divided on other rafts of reeds."

While the rest of the Spaniards remained to guard their own shore, this little flotilla began to paddle across the river. When it approached the other bank, the Indians who were assembled there attacked the rowers with a hail of arrows and sling-stones, and the latter, covering themselves with their shields, could not manage the paddling. The rafts were now caught by the current and drifted down the river so quickly that the Spaniards could not steer them. Some of the horsemen ashore rode into the river to try to rescue Pizarro, but the horses could not swim with the heavily armed riders, and eight horses with their men were drowned. The raftsmen managed to get back to their own bank again, and Pizarro decided to send for more of the old balsa logs on the nearby lake-shore. Valverde continues: "Since he was very anxious to avenge the lost Spaniards, he sent during the afternoon for more logs of the light sort of wood which, as stated, Huayna Capac had caused to be brought there. When they came with the logs in the morning, he [Pizarro] had two large rafts made, and launched them in the lake near its outlet, to prevent the strong current from carrying them away again; he also ordered the Indians to make themselves rafts. Hernando Pizarro embarked on one of the great rafts with forty Spaniards of the foot, and on the other embarked Gonzalo Pizarro and Alonzo de Toro with their horses." By crossing the southern end of Titicaca with this little flotilla of rafts, the heavily armoured Spaniards managed to get to shallow water on the other side, in spite of the shower of sling-stones and arrows with which they were met. "He [Pizarro] now ordered that the rafts should return and fetch the cavalry which was left on the other side. ... The friendly Indians [on the west shore] launched so many rafts into the river that when the enemy on the other side spread out to protect the country, they could not prevent the Spaniards from reaching the shore, and the latter drove them away. The log-rafts continued with great speed to fetch new horses, and the lake was very wide near the mouth of its outlet. In the meantime the Spaniards continued to fight on foot, and since they were covered with armour the enemy could not hurt them..."

It sounds fantastic that a prehistoric ruler of Peru should have made his men carry balsa logs hundreds of miles overland through barren desert mountains to build himself buoyant rafts on the highland lake, and we might have dismissed the story if it had been based on Inca tradition alone. But since the logs were actually there on the arrival of the Spaniards, and served them to carry armoured footmen and cavalry across the lake, we are justified in analysing the transportation problems overcome by the Inca. Let us first bear in mind that the transportation of balsa logs must be judged differently from that of other timber of similar size. The specific gravity of dry balsa wood is lighter than that of cork, and a single man can easily carry a log one feet thick and thirty feet long. An enormous log can therefore be carried on the shoulders of three or four strong men. As the early Spaniards pointed out, a boy can easily carry a section of a trunk three or four yards long. Whatever the source of the Titicaca logs may have been, they must have reached the lake-shore along some overland route, and the Indians said that the Cuzco Inca had caused them to be carried on the shoulders of his men. We also learn that they were brought from a distance given by the Spaniards as 300 leguas, or 1 200 miles. This is in fact the distance from the place where they were found by the Spaniards to the place where such trees were known by them to grow in forests, namely the Tumbez area of north Peru and the large former balsa forests in the vicinity of the Guayaquil Bay. Unless the overland transportation was so easy that the logs were carried by preference along the Inca roads from Tumbez to Cuzco and Lake Titicaca, we may well assume that they were navigated as rafts down the coast to the Pacific port of Ilo in south Peru, and then carried the very much shorter distance along the mountain tracks from Ilo up to the vicinity of Tiahuanaco and the southern end of Titicaca. This would seem to be by far the simplest route, simpler even than fetching the balsa timber from somewhere in the jungle area east of the Andes. Dry balsa logs, sufficient for a few large rafts, could be carried from Ilo and up to Titicaca by a hundred strong Indians in a couple of weeks. When the Cuzco Inca still held power in the Andes, he employed relay runners (*caski*) who brought him fresh fish from the Pacific coast in two days. (Cobo 1653, bk. XII, ch. 32.) We should neither forget that the aboriginal ruler of Peru had the power of commanding an unlimited *mit'a*, or labour service. As Rowe (1946, p. 271) points out: "Through the *mit'a*, the Emperor moved building stone, balsa wood, tropical products, and luxuries throughout the Empire as needed." The same author also writes (*Ibid.*, p. 240): "Huayna Capac had balsa-wood logs brought to the two largest Highland lakes to build large rafts there. The Spaniards found them in Lake Junín, and in Lake Titicaca.

The first Spaniards in southern Peru found balsa timber that had been successfully transported hundreds of miles from the nearest balsa forests on the command of the last pre-Conquest Inca. Yet he was not the institutor of raft navigation on the highland lake. We recall from Inca traditions a similar type of craft used by Zapalla, "the Only One", who is sometimes assimilated with Viracocha and sometimes appears in other periods, even as a title of the first Inca: "The first Indian lord who began to enter foreign lands was called Mango Ynga Zapalla... He went forth with armed people from a large island called Titicaca, which is in the midst of a lagoon that is very large and quite deep, ... he went forth with many people from the Island, in many rafts made of canes and dry wood." (Gutierrez 1603, Vol. III, p. 421.)[1]

Summary of information from early chroniclers

We have learnt from the early Spaniards that sea-going balsa rafts had their main prehistoric centre in the good harbours and islands near the forest country of northern Peru and southern Ecuador, that is, principally, in Tumbez and Payta in Peru proper, and in Guayaquil and Puna Island in prehistoric Peru, now in Ecuador. From here balsa logs, either lashed together as balsa rafts or shipped as building material for balsa rafts, spread

[1] Cieza (1553—60, Bk. II, Ch. XLI, p. 157) says: "...during the rule of Inca Huiracocha power was held by an emperor called Zapana like another man who had the same name; and since there were in Lake Titicaca populated islands with large rafts, he proceeded to the islands, where he attacked their occupants, and between him and them great battles were fought, in which he ended as victor."

for great distances up and down the coast. According to written records the northern limit for balsa logs directly transported in prehistoric times is represented, on the Pacific side of South America, by the large sail-carrying thirty-ton raft met by Ruiz on the northern boundaries of Ecuador, which was northbound in the pearl-shell trade, and was therefore heading for Colombia, Panama, or the Pearl Islands. The southern limit was in the southern part of Peru, represented by the abandoned logs found by the Spaniards in the vicinity of Tiahuanaco, in the present Bolivia, which sufficed for them to construct three or more large rafts, each capable of carrying up to forty armoured Spaniards, or a couple of armoured men with their horses. We have learnt from these earliest Spaniards of both the great capacity and seaworthiness of these aboriginal balsa rafts, and we have also learnt the essentials of their construction. As they varied in size according to purpose, they also evidently varied slightly in construction. The larger balsa rafts were composed of seven, nine, or eleven parallel logs secured by cross beams and lashed securely together by strong and excellent henequen rope, or occasionally the very tough *bejuco* liana. The longest log was in the middle, usually projecting at both ends, while the bow was always shaped like a plough or in the shape of the tapering hand. A deck, or platform, sometimes made of reeds, was placed as a flooring over the logs to keep crew and cargo dry, and cooking was done in a galley-place which sometimes was in the middle of the raft. Both masts and yards were made of "very fine wood", and the cotton sails had the same shape and worked in the same manner as on the Spanish caravels, i. e. they were cut square and hoisted on yards suspended from a fixed point in their own upper middle part. As to the quality of cordage and canvas in aboriginal America, we have seen that the former was "beautiful, and stronger than that of Spain", and that similarly, "their cotton canvas is excellent." The *bejuco* is a product of nature alone, and its quality can still be confirmed to-day. *Bejucos*, if applied as lashings while still green and pliable, harden like extremely tough barrel-hoops and are ideally adapted for lashing the softer balsa-wood logs of a partly submerged raft.

Finally, we have learnt from the earliest chroniclers that whereas reed-rafts were used by the average individual fisherman in his daily life on the ocean in front of his own door, the larger sail-carrying log-rafts were used for carrying heavy cargo by sea, for transporting merchants and their women on missions to foreign lands, for enabling fishermen to carry out many weeks of continuous fisheries in the open ocean, for conveying troop-transports and naval expeditions by sea, and for facilitating imperial exploring-expeditions in search of islands suspected to exist further out in the open Pacific. In other words, the sail-carrying balsa rafts served each and all of the various purposes of a regular small-size ship. The tiny reed-boats and three-log *caballitos*, which went from ten to twenty or more miles out in the ocean current, sufficed for the purpose and economy of the individual Peruvian fisherman, as the open home-made rowing-boat sufficed for the poor individual fisherman in mediæval Europe. In early Peru, as in the Old World, the larger sail-carrying craft, *which required a crew of sailors and paddlers*, were owned and operated not by the poor fishermen, but by some organized group under a common leadership, by wealthy merchants, or by an executive civilian or military aristocracy. Therefore the small individual craft would probably be in a great numerical majority over the larger sailing craft in the aboriginal New World also.

Probably very little provisions and water were carried in the average fisherman's reed-craft, as we may safely assume that the smaller of these craft generally returned to land with their day's catch. The larger reed-boats were probably prepared to remain out at sea overnight, for it can hardly be supposed that they, all in one day, paddled twenty miles or more out at sea, caught their fish, and covered the same distance back again, a travelling distance of 40—50 miles in addition to the time required at the fishing-grounds.

Certainly the great wooden rafts were not designed for one-day trips. Their crew, we have learnt, went off on long voyages. The early Spaniards do not tell us much about storage and supply on board the aboriginal balsa rafts. But we do learn that there were cooking places; in drawings we also see water-jars on the deck, and we hear casually that the natives threw some of their provisions overboard as sacrifices to the weather-gods if they found themselves unable to struggle back to the coast. Obviously, the pearl-shell merchants who went on their missions hundreds of miles up the coast had storage capacity and adequate provisions; so had the balsa raft flotilla from Tumbez which was heading for Puna Island and shared its food with the arriving Spanish caravel; the Inca deep-sea expedition which sailed in search of land; and the fishermen who were away from Payta for two months and came back with enough food to distribute among Spilbergen's ships. The Peruvian coastal area was thus fully equipped to send well supplied explorers or casual drift voyagers away into the open sea.

Juan and Ulloa's technical description of balsa rafts

Only against this background of original information from the earliest time of European contact can we judge the value of the more technical and accurate reports on these rafts that have come down to us from subsequent writers.

One of the most informative reports on aboriginal South American balsa rafts was published more than two hundred years ago by two Spanish naval officers, Juan and de Ulloa. In 1736, when the aboriginal balsa rafts were still a common sight on the Pacific coast of Ecuador and Peru down to the Trujillo area of the eighth degree south, these Spanish experts on sailing craft and navigation made them the subject of a thorough-going analysis. They were specially interested in finding out how it was possible for the Indians to steer and navigate these completely flat-bottomed sailing-rafts. They even succeeded in detecting and interpreting the aboriginal secrets of centre-board navigation, a most ingenious and original method of steering and actually turning, which, when put on record by Juan and Ulloa, was still unknown to naval experts and boat-builders of contemporary Europe. The efforts of these Spanish naval officers to introduce this method of steering to their own countrymen failed in their own century, and centre-boards as such remained generally unknown in Europe and North America until about 1870. (Lothrop 1932, p. 237; Hornell 1946 b, p. 82.) When lashing on five centre-boards as mere lee-boards before departure in 1947, the members of the Kon-Tiki expedition were unable to obtain practical advice from any of the great many experts consulted as to how to actually *steer* a raft by means of centre-boards. If we had then been familiar with Juan and Ulloa's report, and had fully understood the ancient native principles of centre-board steering, we should probably have steered ashore safely on the first Polynesian island we saw, instead of being forced to crash-land through the surf on the windward side of a reef, after drifting past two earlier islands within sight of land.

The main interest in Juan and Ulloa's early study of the balsa raft lies in their analysis of the raft's peculiar sailing principles, never before explained in full, and also in their drawing of such a raft sailing in the Gulf of Guayaquil, as reproduced here in Plate LXVI. Ulloa's description of rafts seen at Guayaquil adds very little to what we already know about their actual construction. Describing first the softness and lightness of the balsa logs, of which an odd number were lashed together to form the 'balza' the author says (1748 b, p. 189):

"The name sufficiently explains their construction, but not the method of navigating them, which these Indians, strangers to the arts and sciences, have learned from necessity. . . . Over part of it is a strong tilt, formed of reeds. Instead of a mast, the sail is hoisted on two poles or sheers of mangrove wood, and those which carry a foresail have two other poles erected in the same manner. *Balzas* are not only used on rivers, but small voyages are made at sea in them, and sometimes they go as far as Paita. Their dimensions being different, they are also applied to different uses; some of them being fishing Balzas; some carry all kinds of goods from the custom-house [of Babahoyo] to Guayaquil, and from thence to Puna, the Salto de Tumbez, and Paita; and others, of a more curious and elegant construction, serve for removing families to their estates and country houses, having the same convenience as on shore, not being the least agitated on the rivers; and that they have sufficient room for accommodation may be inferred from the length of the beams, which are 12 or 13 toises [about 75 or 90 feet] and about two feet or more in diameter, so that the 9 beams of which they consist form a breadth of between 20 and 24 Paris feet; and proportionately in those of seven, or any other number of beams.

"These beams are fastened or lashed together by Bejucos, and so securely that, with the cross-pieces at each end, which are also lashed with all possible strength, they resist the rapidity of the currents in their voyages to the coast of Tumbez and Paita. The Indians are so skilful in securing them that they never loosen, notwithstanding the continual agitation; though by their neglect in examing the condition of the Bejucos, whether they are not rotten or worn, so as to require others, there are some melancholy instances o Balzas, which in bad weather have separated, and by that means the cargo has been lost, and the [white] passengers drowned. With regard to the Indians, they never fail to get on to one of the beams, which is sufficient for them to make their way to the next port. One or two unfortunate accidents of this kind happened even while we were in the jurisdiction of Quito, purely from the savage carelessness of the Indians. . . .

"The larger sort of Balzas generally carry between 4 and 5 hundred quintals [almost 20 to 25 tons], without being damaged by the proximity of the water; for the waves o the sea never run over the Balza; neither does the water splash up between the beams, the Balza always following the motion of the water.

"Hitherto we have only mentioned the construction and the uses they are applied to; but the greatest singularity of this floating vehicle is, that it sails, tacks, and works as well in contrary winds as ships with a keel, and makes very little leeway. This advantage it derives from another method of steering than by a rudder; namely, by some boards, three or four yards in length, and half a yard in breadth, called *guaras*, which are placed vertically, both at the head and stern between the main beams, and by thrusting some of these deep in the water, and raising others, they bear away, luff up, tack, lay to, and perform all the other motions of a regular ship. An invention hitherto unknown to the most intelligent nations of Europe, and of which even the Indians know only the mechanism, their uncultivated minds having never examined into the rationale of it. Had this method of steering been sooner known in Europe, it would have alleviated the distress of many a shipwreck: by saving numbers of lives, as in 1730, the Genovesa, one of his majesty's frigates, being lost on the Vibora, the ship's company made a raft; but committing themselves to the waves, without any means of directing their course they only added some melancholy minutes to the term of their existence. Such affecting instances induced me to explain the reason and foundation of this method of steering in order to render it of use in such calamitous junctures;..."

Ulloa then proceeds to quote a memoir drawn up by Juan, who discusses, with a contemporary text-book on navigation, the principles of establishing a counter-pressure to the leeway movement of a sailing craft. The author thence returns to explain the action of the balsa rafts' *guara*, or centre-board:

"Whence it follows that a *Guara* being showed down in the fore-part of the vessel must make her luff up; and by taking it out, she will bear away or fall off. Likewise on a *guara's* being showed down at the stern, she will bear away, and by taking it out of the water, the balza will luff, or keep nearer to the wind. Such is the method used by the Indians in steering the Balzas, and sometimes they use five or six *guaras*, to prevent the Balza from making lee-way, it being evident that the more they are under water, the greater resistance the side of the vessel meets with; the *guaras* performing the office of lee-boards used in small vessels. The method of steering by these *guaras* is so easy and simple, that when once the Balza is put in her proper course, one only is made use of, raising, or lowering it as occasions require, and thus the Balza is always kept in her intended direction."

We also learn from Juan and Ulloa (*Ibid.*, p. 193) that the Indians (and by this time also mulattos) in the proximity of Guayaquil were cut off from their small inland farms during the rainy season, and spent all this time on board their balsa rafts, moving continuously along the shore and fishing. They had their whole families along, living on board in huts thatched with *vijahua*, and they subsisted on fish in addition to all the hung meat and plant food they carried along to last them throughout the rainy fishing season. It is also interesting to learn that they had canoes on board the balsa rafts, and, with hand-harpoons or spears and also nets they paddled about catching large fish; this was done with such skill that "they load their canoes in three or four hours, when they return to their balzas to salt and cure them."[1]

Charnock's reference to balsa rafts

When Charnock (1801, Vol. I, p. 12) a hundred and fifty years ago published his great history of marine architecture, he based his information on South American balsa rafts

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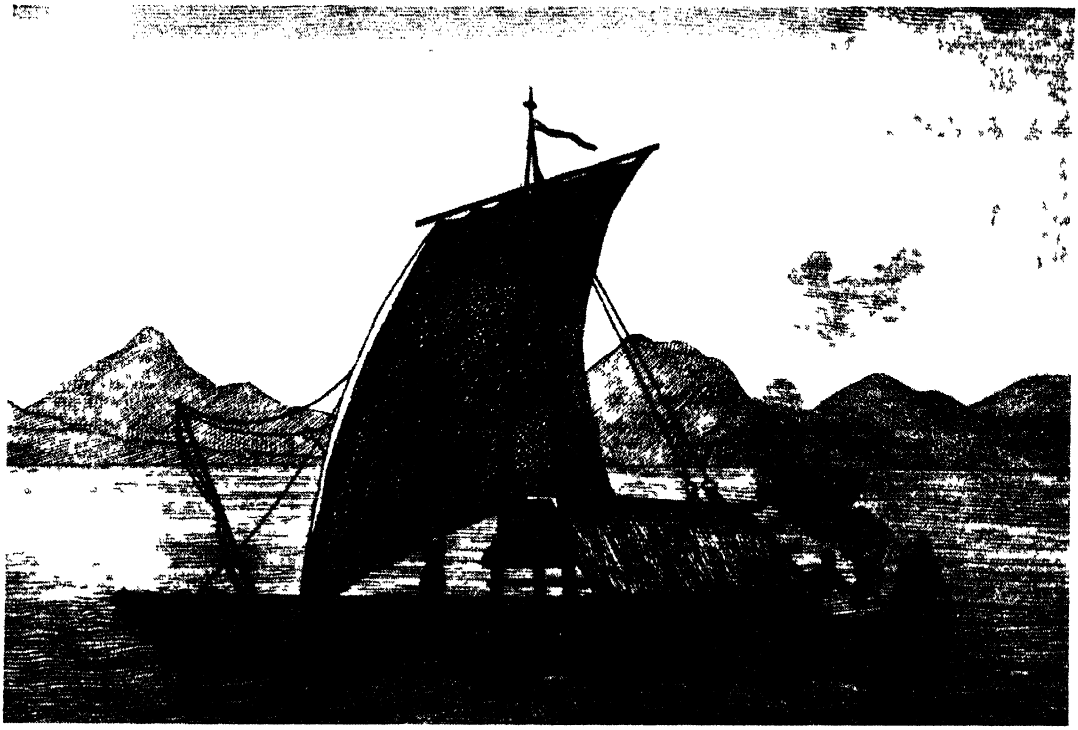
[1] We also learn in the same connection that these Indians chewed poisonous herbs and scattered them on the water mixed with some bait. "The juice of this herb is so strong, that a fish on eating a very little of it becomes inebriated, so as to float on the surface of the water, and the Indians have no other trouble than to take it up." The poisoning of fish in this manner is an ancient custom right across the Pacific, including Polynesia.



Balsa raft in a hand-coloured Italian print from about 1835, apparently redrawn from Juan and Ulloa's original from 1748. (Courtesy: The Old Print Shop, H. S. Newman, New York.)

mainly on Juan and Ulloa's thorough-going report. Charnock holds that the native invention of raising and lowering their *guaras* between the logs enabled their rafts to tack up against the wind like a regular keeled vessel. It is very significant to note that this leading authority on marine architecture in his day stated that the method of steering by means of *guaras* was an art peculiar to these American Indians, and hitherto unknown in Europe.

Humboldt's balsa raft

The next illustration we encounter of a balsa raft is the colour drawing published by Humboldt in 1810, and reproduced here in its original colours in Plate XXXIII **2.** Humboldt (1810, p. 295), after whom the local current has been named, points out that the drawing has a double purpose namely to show the variety of local fruits piled on deck,[1] "and to make known the form of these great rafts (balzas) which the Peruvians have made use of since the earliest times on the coasts of the South Sea and in the mouth of the Guayaquil river."

The same authority informs us that the rafts were made of a very light wood, *Bombax* and *Ochroma* (balsa), and that the largest fishing and transportation rafts were from 16 to

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[1] Among these he specifies the pineapple, avocado, banana, coconut, *Heliconia*, etc.

25 metres (about 50 to 80 feet) long. He quotes Juan and Ullao on their discovery how these seemingly clumsy sailing craft actually could be steered at will, even close to the wind.

The large balsa raft from Guayaquil, drawn by Humboldt, shows a type which is apparently adapted for maximum deck space, needed for the local transportation of cargo. On fishing and travelling balsas, the wall of the bamboo hut would probably be withdrawn further from the edge, and the cooking-place, as described by Oviedo, would be amidships rather than aft. Also, the side logs would have been shortened at the bow to cut the seas like the fingers of a hand. Obviously, there was nothing to prevent the owner of a balsa raft from utilizing and arranging the deck space to suit his own taste and requirements, and the same may be said of the size and capacity of the raft. The thirty-ton balsa raft captured by Ruiz in his early days was as large as any described by Humboldt. We deceive ourselves if we believe that the length of the timbers and the size of the rafts increased as a result of European influence. Unfortunately, we shall find in South America, as elsewhere, few aboriginal culture elements whose period of bloom was *after* the arrival of the Europeans.[1]

Stevenson's report on balsa rafts

In his *Historical and Descriptive Narrative of Twenty Years' Residence in South America*, Stevenson (1825, p. 222) also devotes special attention to the balsa rafts of the natives. Judging from the simplicity of its construction, he assumes the balsa raft to be one of the earliest manifestations of the art of ship-building. He adds that it certainly was "...the only large vehicle in possession of the natives when the Spaniards arrived in this part of the New World. Of the convenience of this rude vessel, both Asara and Acosta speak, when Orellana transferred the city of Guayaquil from the bay of Charapota, near to where the town of Monte Christi now stands, to the western shores of the river, because it served to transport his soldiers, auxiliaries, and stores, when the Indians burnt that town in 1537."

Stevenson's description of how an odd number of balsa logs are lashed together to form the raft, covered by cross beams and a deck of split bamboo or canes, is only a repetition of what we already know. He is also interested in the peculiar sailing method, and says (*Ibid.*, p. 223): "Instead of a mast, the sail is hoisted on two poles, or sheers, of mangrove wood, inclining a little forward, being supported by two backstays. The sail is a large square lugsail, with halyards and braces. For propelling the balsa along during a calm, the natives use a long paddle, broad at the lower extremity; they let this fall perpendicularly at the stern of the balsa, and then drag the end forwards, by which means the broad end of the paddle sweeps through the water as it rises and impels the balsa forward, though very slowly. The rudder is formed of one of these paddles lashed astern, and is managed by one or two men; besides which they have several boards, each three or four yards long and two feet broad, called *guaras;* these they insert between the main or central logs, and allow them to dip more or less into the water: these boards serve for a keel, and prevent the balsa from upsetting or making much lee-way. By raising or lowering these boards in different parts of the balsa, the natives can perform on their raft all the manoeuvres of a regular built and well-rigged vessel, an invention which I believe is not generally known, and the utility of which might be very great in cases of shipwreck, where the seamen have to betake themselves to rafts, without being acquainted with so easy a method of steering them, and of preventing them from capsizing.

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[1] Humboldt's balsa raft is also reproduced by Hill (1860, p. 116), Means (1942), and Leicht (1944).

"All the balsas have a small shed built on them, which serves the purposes of a cabin; they are formed of canes, and the roof is covered with palm leaves, or those called *vijao*, which are similar in shape to those of the banana, but not so liable to break or split. Some of the large balsas have a comfortable house built on them, composed of four, five, or more rooms; the sides and roof being lined with chintz, with mats on the floors; and are most comfortable conveyances for passengers or parties of pleasure."

In Stevenson's time these balsa rafts still covered the whole coast of what was formerly the Chimu habitat, since he specifies Peruvian harbours like Paita, Sechura, Pacasmayo, and even Huanchaco, as ports of call for the Indian balsa rafts. Huanchaco is five hundred miles from Guayaquil, and, as Stevenson points out, balsa rafts reaching this place were "beating up against the wind and current a distance of four degrees of latitude, having on board five or six hundred quintals (25 or 30 tons) of goods as a cargo, besides a crew of Indians and their provisions."

Paris' technical draft of Peruvian balsa raft

When Paris more than a century ago collected material for his essay on naval construction among non-European peoples, he was in South America in time to see the aboriginal Peruvian balsa rafts before they were almost completely displaced by European boats at the turn of the century. His comprehensive work published in 1841—43 includes, beside his verbal description, a most excellent draft of all details pertaining to the building principles of the balsa raft, as well as a pen drawing of some of the coastal craft moored in the bay of Guayaquil. They are reproduced here respectively in Plate LXVIII and Plate LXIX.

Paris (1841—43, p. 148) says:

"In Peru they have preserved the use of rafts as constructed by the ancient inhabitants, which are sufficiently well suited to the localities to be still preferred to all other craft; one still sees a large number of them at Guayaquil, going down the river and navigating along the coast, . . ."

Paris states that his own drawing (Plate LXIX) shows what the balsa rafts were usually like, but he adds: "One can well imagine, from their mere nature, that these rafts and their cabins are bound to show some variation." The mere dimensions were found by Paris to vary considerably, the very largest being 25 to 28 metres (about 80 to 90 feet) in length, by 7 to 9 metres (about 23 to 30 feet) in breadth. He found that they navigated with twenty or twenty-five tons of cargo out to Puna Island or down the coast of Paita, and said that "they behave well in this sea and ride the waves with sufficient ease. There are also some intended for passenger transport, and then the cabin occupies nearly the whole length."

The cabin which, Paris says, varied according to the raft's purpose, was raised above the main bottom logs by a deck placed on transverse balsa beams. It was built of cane covered by a roof of coconut leaves, and sometimes there was also a railing of stakes.

attached to the side of the raft. If they found it necessary, the local Indians sometimes made rafts which consisted of three compact tiers of balsa logs, two lengthwise and the one in the middle crosswise. Such rafts were able to carry very heavy weights. Sometimes they even added extra cross beams to support a small upper deck if it was necessary to keep some of the cargo especially high above the sea. Paris also analysed their method of propulsion and navigation:

"The Jangadas [balsa rafts] have only one mast, made of two spars of mangrove wood lashed together to form a bipod mast with its base resting on the side of the raft. The mast is held upright by two ropes running fore and aft, it has no fixed length but is about $^2/_3$ or $^3/_4$ of the length of the raft; and much less on the rivers. A flexible yard, directed by two arms, sometimes by two slings, and upheld by a halyard which is seldom attached to the centre of the yard, carries a square sail of cotton, often of a considerable size, which can be worked by brails, and reduced by ordinary reefs. ...

"For steering, there are boards called *guaras*, which are sunk vertically in the intervals between the middle logs. These are driven in to a greater or lesser degree, fore or aft, in order to luff or go about. The rafts have no other methods for steering on the ocean,..."

Paris refers to an article by Lesçalier, in which the latter quotes the observations of Juan and Ulloa on the native invention and use of centre-boards. Lesçalier was fascinated by this unconventional method of steering, which was still at that time a feature peculiar to the native balsa rafts of South America. Describing the system, which he said was easy to understand, he ended: "I have felt it my duty to write in detail about this kind of vessel; if it had been known sooner in Europe, how many shipwrecks would have been rendered less fatal, and how many crews, who have perished in the waters, could have saved themselves by quickly making rafts of this kind."

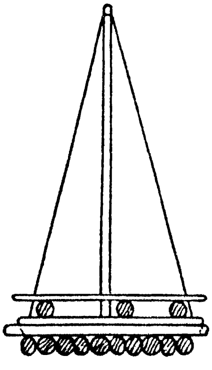
Paris' comment on this defence of centre-board navigation is that "we do not know if it is as perfect as M. Lesçalier says", and: "We have not been able to observe these ingenious rafts sufficiently to be sure that they really do carry out all these manoeuvres,..." He admits that by lowering or raising the centre-boards fore and aft the balsa rafts can be made to luff and go about, but he is very reluctant to accept Lesçalier's claim (with Juan and Ulloa) that a correct handling of the centre-boards can make the balsa tack up against the wind.

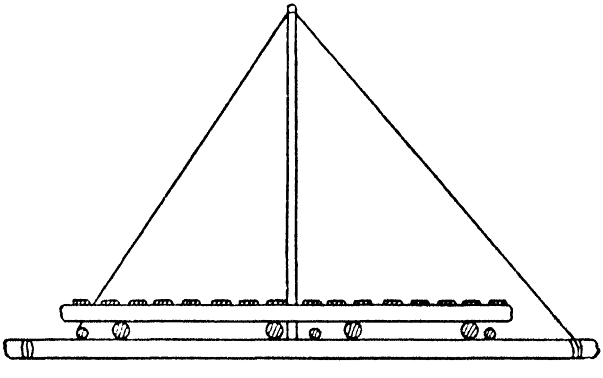
Recent sources

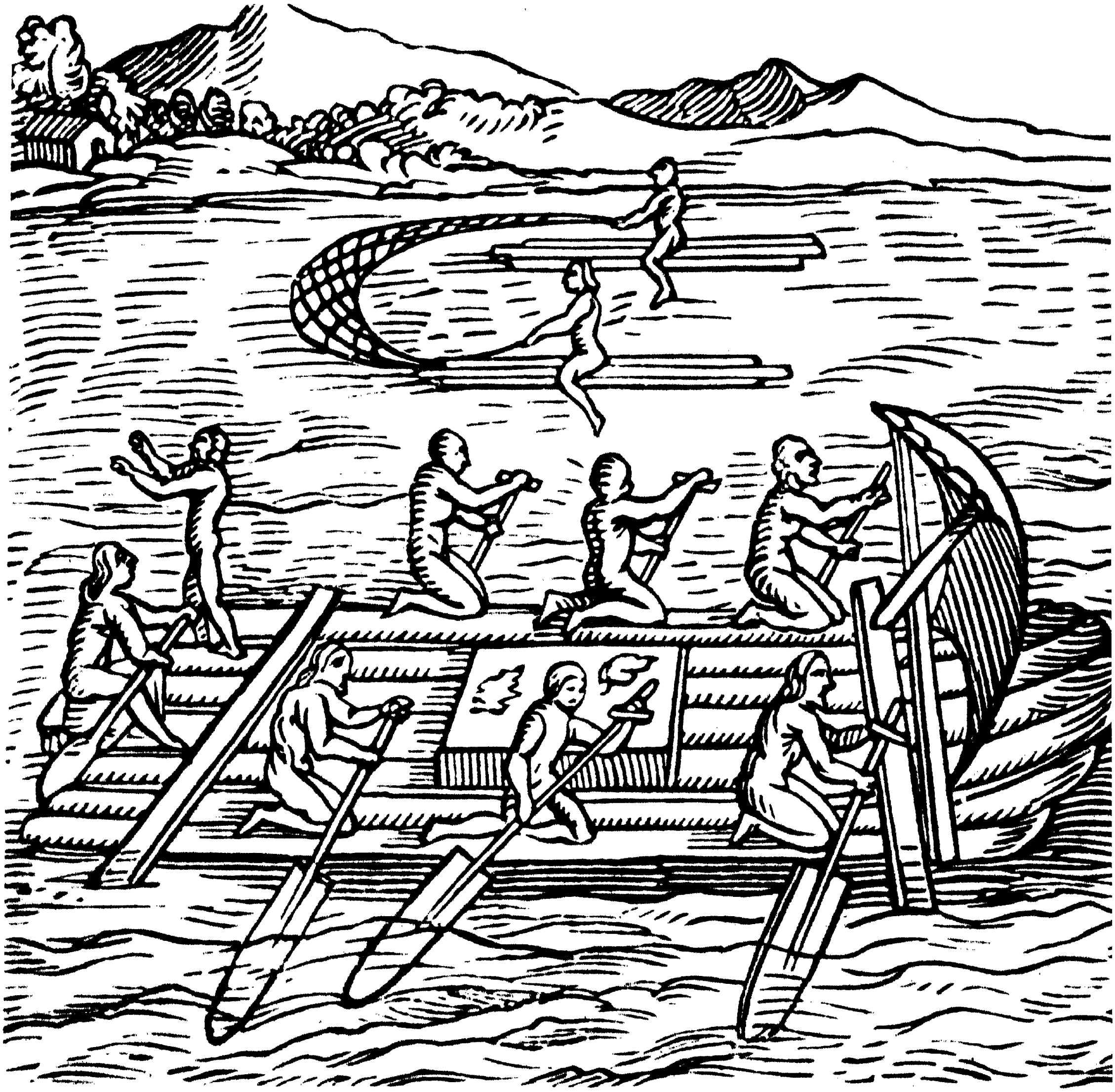
Among the modern authors who have devoted attention to the maritime skill of certain peoples in aboriginal America, Friederici (1907) holds a prominent place. In his monograph on the subject he goes a long way to remove the popular misconception that all American aboriginals were prairie-, desert-, or jungle-dwellers. Among the most obvious exceptions he mentions the seafaring Northwest Coast Indians, the Island Caribs, the peoples of the Isthmus, of Santa Marta, Venezuela, Guiana, coastal Brazil, and not least those of the Pacific waters of the Inca Empire. He shows (*Ibid.*, p. 22) that log-rafts were used at sea off Lower California, where Cortez describes some with the whole bow arranged in the shape of a plough and with the central log projecting also at the stern, just as was customary in Peru. Smaller specimens of the log-raft (*jangada*) so common in Brazil, were also in use among the Island Caribs, who at the same time possessed roomy sea-going canoes like so many Mexican and Central American maritime peoples. In Peru Friederici describes sail-carrying merchant rafts as occurring throughout the local coastal waters and extending down into Chile. He mentions how the highland Inca had building material carried to Lake Titicaca for the construction of pleasure craft, and how he possessed a whole fleet of balsa rafts down on the sea-coast. "These balsa rafts were very seaworthy and efficient, and therefore much in favour among the Spaniards." (*Ibid.*, p. 24.) Unfortunately Friederici's monograph does not seem to be as well known as it deserves to be.

In 1912 Joyce included a brief account on balsa rafts in his *South American Archaeology*. He says (*Ibid.*, p. 60): "On the coast, and especially in the islands, the inhabitants were expert fishers, and the peculiar craft in which they plied the trade merit a word of description..." Describing briefly the local log- and reed-rafts, Joyce mentions the spacious type that could carry 'fifty men and three horses,' to which he adds: "This type of boat, which in this neighbourhood seems occasionally to have been used with sails in pre-Spanish days, was found all down the Peruvian coast, as well as on Lake Titicaca."

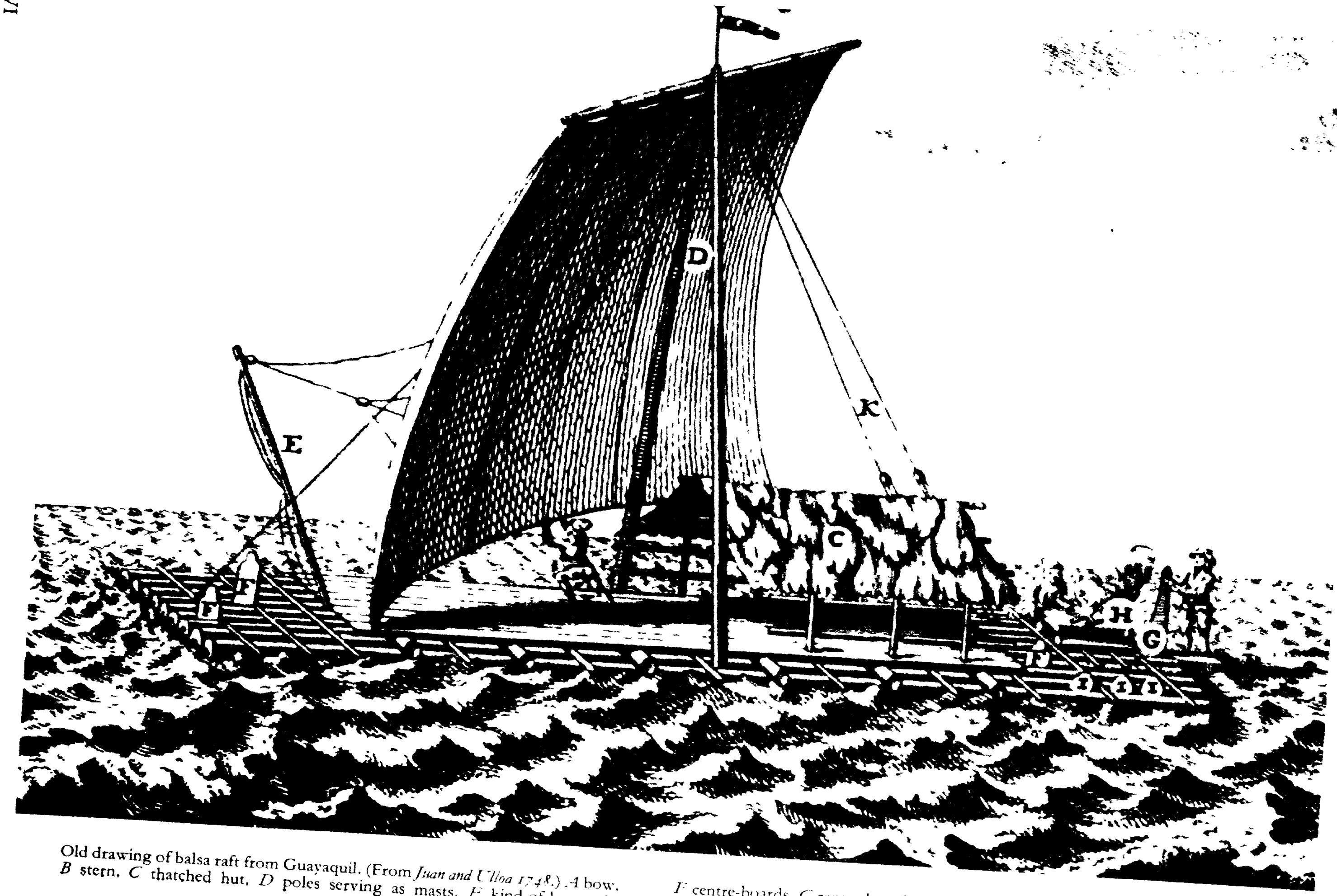
The papers left by the German engineer H. H. Brüning, who resided in Peru from 1875 to 1925, included a report on log-rafts on the coast of Peru, published by Antze in 1930. This is probably the last eyewitness account of the existence in Peru of the now extinct balsa raft. The paper includes the sketch which is reproduced below. Brüning (1930, p. 368) states that until the year 1900 the balsa rafts were still used to some extent on the Pacific coast of Peru down to Pimentel harbour, south of Lambayeque. The building material was balsa wood (*Ochroma piscatoria*), and the logs for building the rafts were transported down the coast from Guayaquil, likewise the hard mangle-wood and other building material required. Brüning measured some of the rafts which were composed of logs 17 m (55 feet) long and 40—50 cm (15—20 inches) thick. They were now chiefly used by the Indians for conveying cargo in the treacherous current and surf between the coast and steamers lying off-shore, and were observed to have a carrying capacity of 150 sacks of rice, weighing 13 tons, well sheltered. The author claims that after use the raft was broken up into separate logs, which were pulled ashore to dry. Through cracking of the logs, wearing and absorption of water, their capacity decreased gradually to 90 sacks, or 7.8 tons. When launching them, the Indians waited for high tide. As soon as the wind was ready to fill the sail, the crew of 15 Indians launched their balsa with loud shouts,



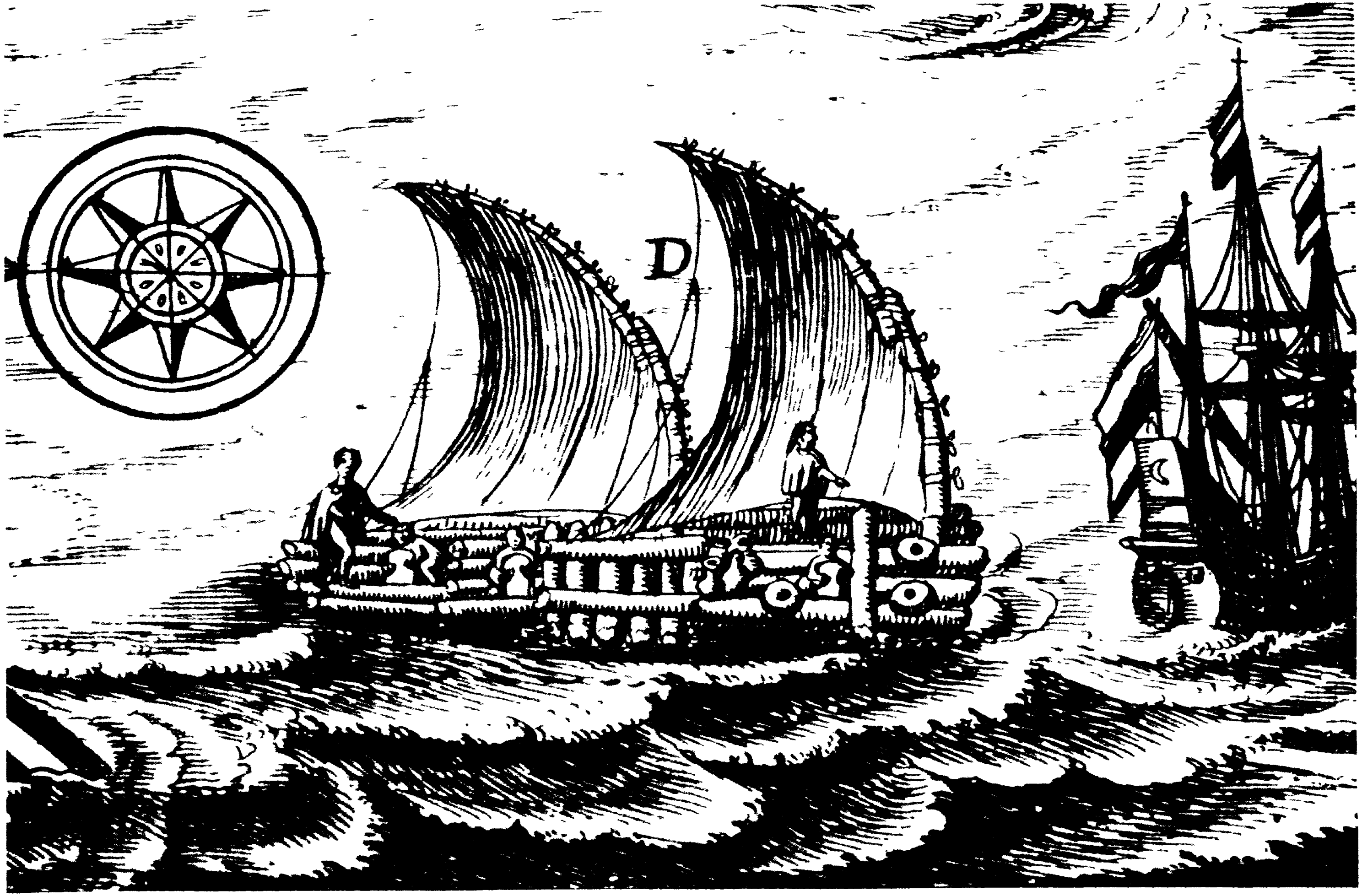




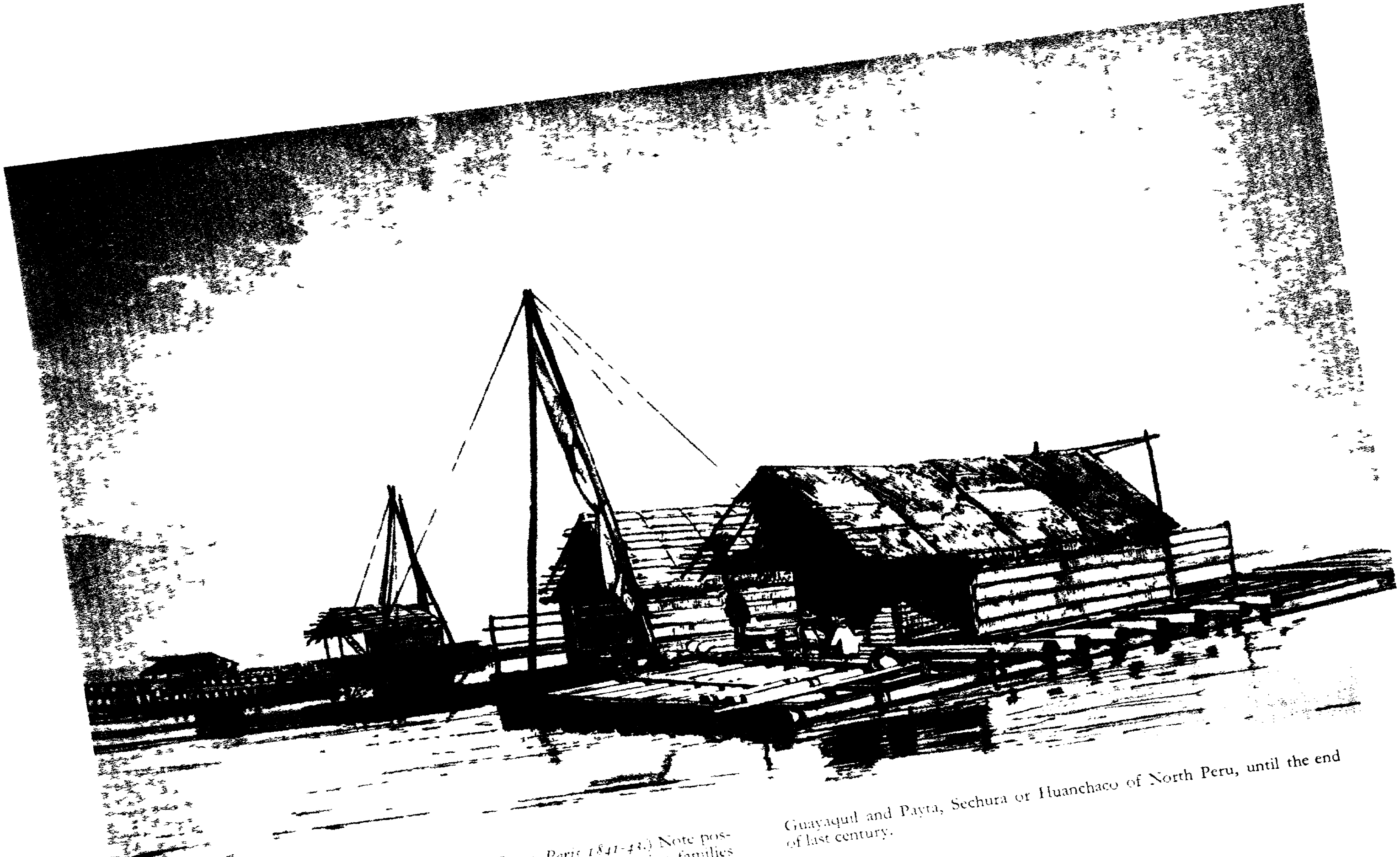
Peruvian balsa rafts. Benzoni's primitive illustration of "Method of fishing and navigating in the South Sea". (From *Benzoni 1565.*) In the background are shown two Indian fishermen on their *caballitos*, or three-log fishing rafts. In the foreground a group of eight Peruvian navigators on a small sail-carrying travelling raft. Benzoni himself stated that there were also larger rafts with 11 logs and a proportionally larger sail. When the first Spanish discoverers advanced upon Peru under Pizarro in 1525-26, they met at sea off Ecuador a large northbound balsa raft with excellent cotton sails. When captured, this large raft was found to carry thirty tons of native cargo and a crew of twenty Indian men and women, some of whom belonged to the Peruvian port of Tumbez. At Tumbez a whole flotilla of balsa rafts, bound for Puna Island, met the arriving Spaniards. The largest Peruvian rafts were found capable of carrying "fifty men and three horses".



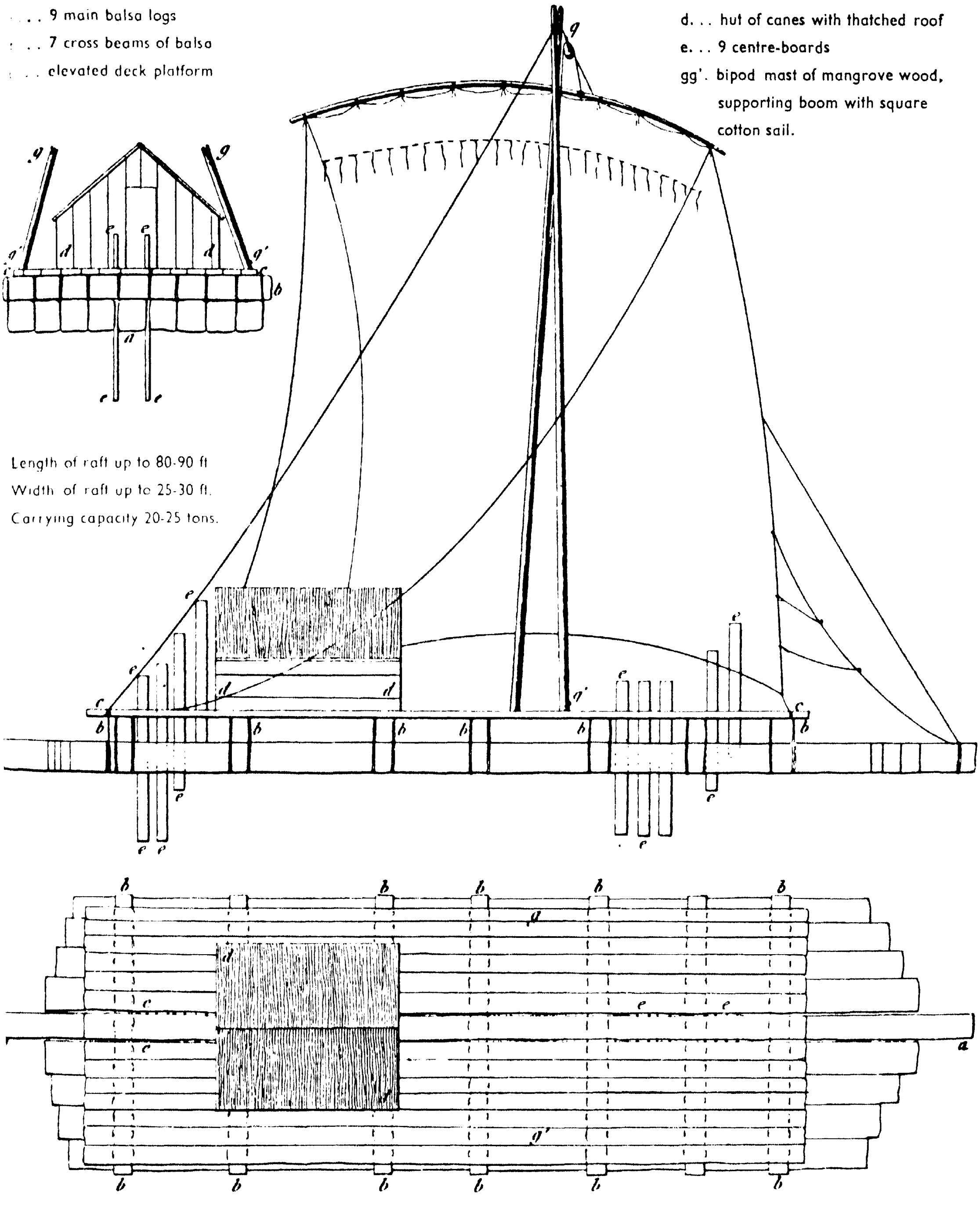
Old drawing of balsa raft from Guayaquil. (From *Juan and Ulloa 1748*.) *A* bow. *B* stern. *C* thatched hut. *D* poles serving as masts. *E* kind of bowsprit. *F* centre-boards. *G* centre-board serving as rudder. *H* cooking-place. *I* water-bottles. *K* mainstays. *L* flooring or deck.



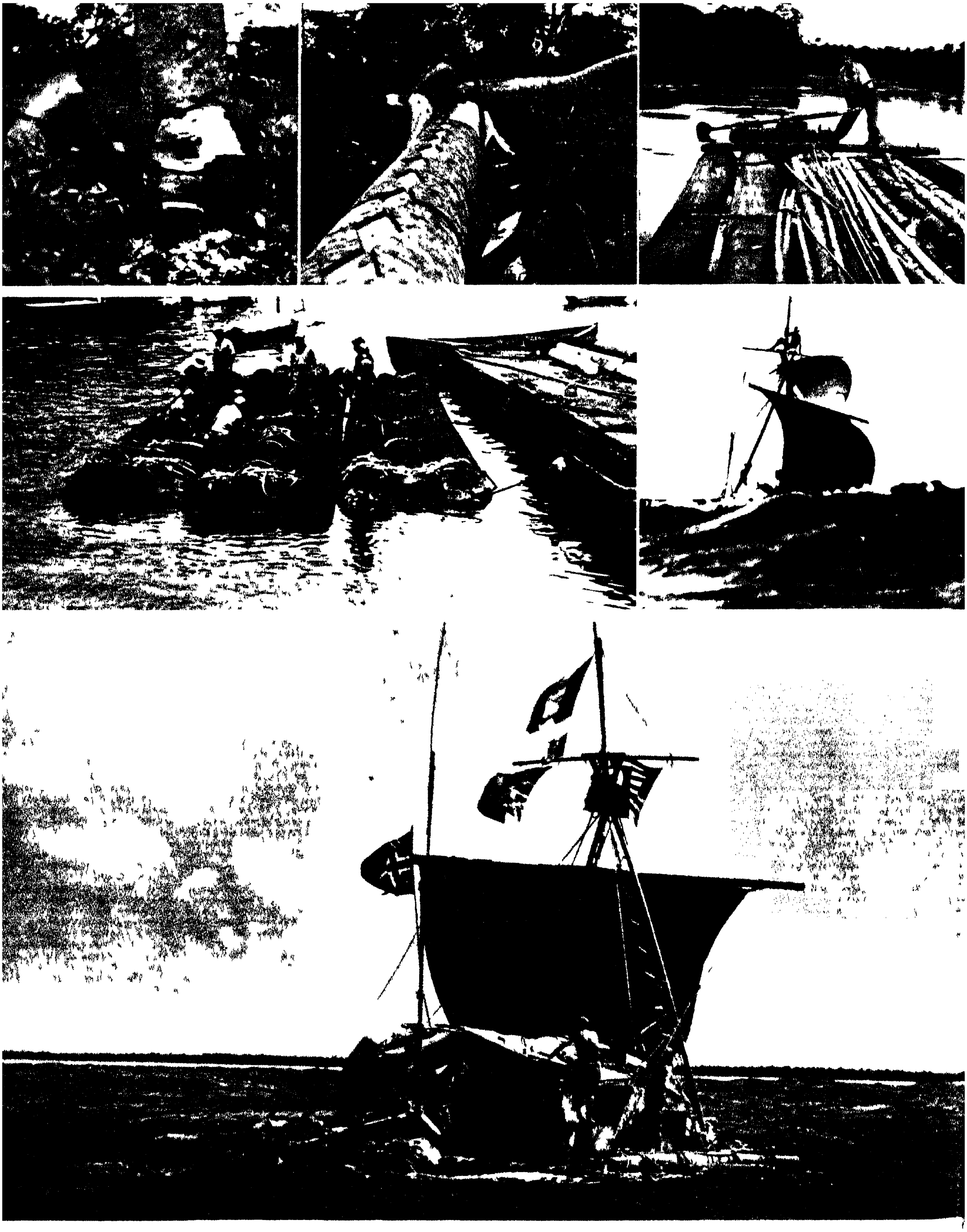
Old drawing of balsa raft at Payta, Peru (From *Spilbergen 1614-1617* "In the afternoon, a fisherman came in from the sea, having a boat and sails very wonderfully made, and in it were Indians, all young, strong, and robust men. they had been out fishing for two months, " Note all navigation being carried out by the three men raising and lowering centre-boards



Balsa rafts moored in Guayaquil harbour. (From *Paris 1841-43.*) Note possibilities of accommodation on the large deck space. Whole native families travelled regularly by these buoyant crafts in the strong currents between Guayaquil and Payta, Sechura or Huanchaco of North Peru, until the end of last century.

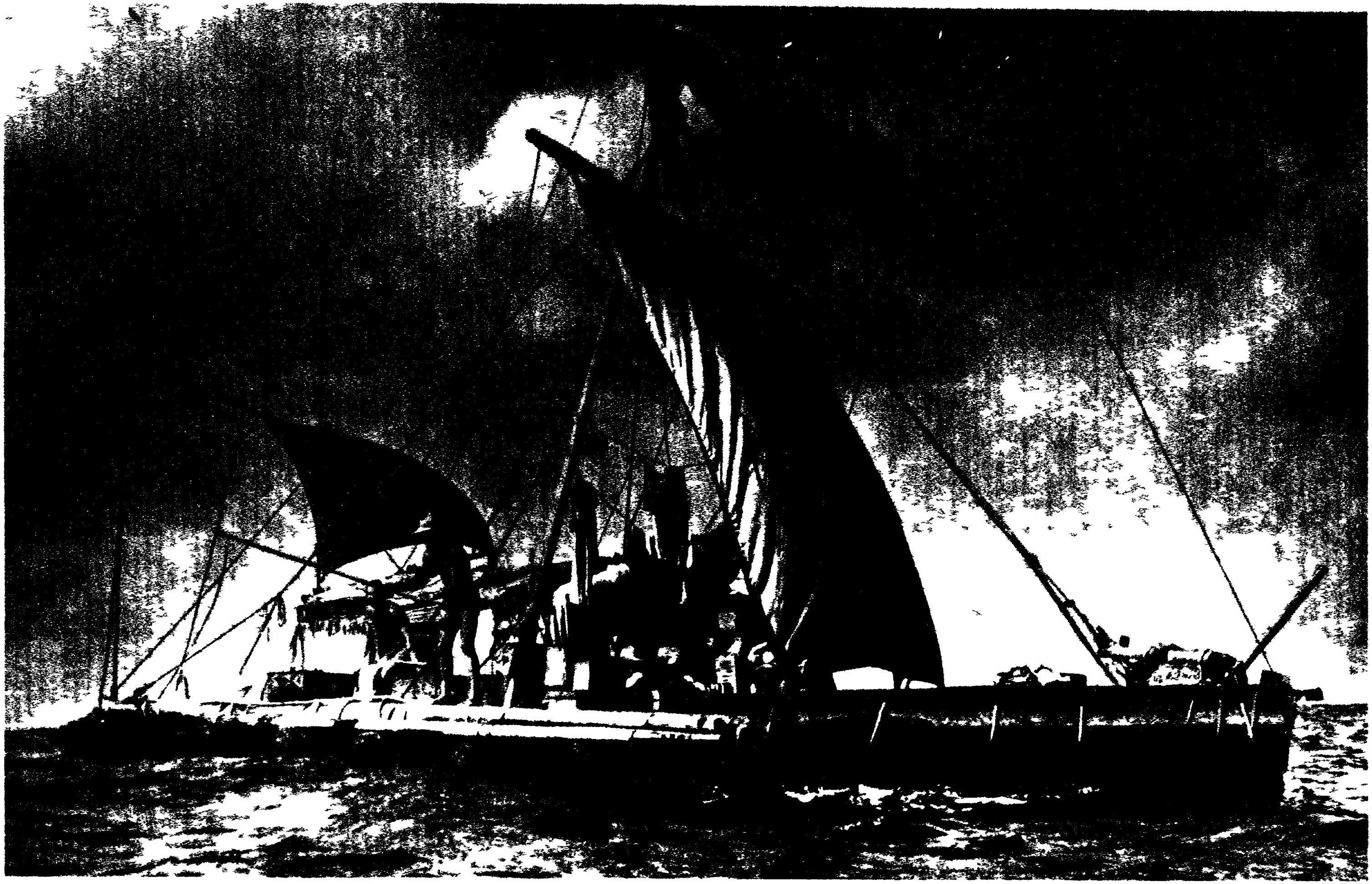

. . 9 main balsa logs
. . 7 cross beams of balsa
. . elevated deck platform
d. . . hut of canes with thatched roof
e. . . 9 centre-boards
gg'. bipod mast of mangrove wood, supporting boom with square cotton sail.
Length of raft up to 80-90 ft
Width of raft up to 25-30 ft.
Carrying capacity 20-25 tons.
g
g'
d
e
b
c
a

The building principles of the aboriginal balsa raft of northwestern South America. Plan made in Guayaquil by Paris (1841-43).



The raft *Kon-Tiki* was built from 9 green balsa trees cut and barked in the interior of Ecuador and floated by river to Guayaquil. When lashed together in Peru, the balsa raft was set adrift in the coastal current off Callao, and entered the Tuamotu Archipelago 93 days later, landing on Raroia eight days later still.

There is food enough in the water around a seaweed-covered balsa raft to sustain a drifting native crew. Water is obtainable from the lymph of raw fish and by collecting rain. On an intentional voyage tons of dried native foods and water could be stored on board. (From *Heyerdahl 1948 b.*)



The *Kon-Tiki* was a medium size balsa raft, measuring 45 feet by 18. Although much smaller than the largest 30 ton balsa rafts, 80-90 feet long as described from aboriginal Ecuador and Peru, it proved to possess quite astonishing sea-going capability and cargo capacity, and was perfectly suited for oceanic voyaging.

and pushed it into the waves till the water was up to their necks, when they climbed aboard and took charge of the steering. Brüning (*Ibid.*, p. 370) writes: "The balsa is steered by four men, one in each corner, who direct the balsa with roughly cut boards which they insert between the logs, thereby forcing or pressing it into its course. These boards serve both as keels and as rudders. The steersmen endeavour to get up against the wind as much as possible when the steamer arrives from the south; it is then an easy matter for them to drift along with the steamer by the use of the northbound current. If the wind was feeble or the current strong, then all their skill was in vain; they had then to take to the long thongs."

Brüning mentions that in the Peruvian harbours of Pimentel, San José and Sechura, the native fishermen made small rafts, *balsillas*, of balsa logs broken and discarded from the larger rafts. With these small rafts they went several miles into the coastal current, visiting such off-shore islands as the Inner and Outer Lobos. (*Ibid.*)

More recently technical descriptions of the construction principles of balsa rafts, based on earlier sources, have been published by Hornell (1931; 1945; 1946 a; 1946 b), Lothrop (1932), Means (1942) and Halldin (1950). They all agree on the building principles, size, and material of the large balsa-log rafts, with their bipod masts, square cotton sails and centre-boards.[1] They also unanimously agree that this type of sailing raft was prehistoric in Northern Peru and Ecuador. As we shall show later, it was until the completion of the Kon-Tiki expedition only the buoyancy, strength, and deep-sea going ability of this prehistoric type of craft that was seriously disputed.

Guano transport and other evidence of maritime activity

Off the coast of Peru are a few islands, uninhabitable for lack of fresh water supply. All of these were regularly visited by the aboriginal natives from the mainland, and a few were even effectively utilized by them, thanks to the seaworthiness of their craft and the good seamanship of the crews.

Morrell (1832) was among the many early navigators who saw Peruvian balsa rafts far out in the Humboldt Current, and the narrative of his voyages to the South Sea contains an interesting entry on those he met during his visit to the Lobos Islands, in the unsheltered ocean off Lambayeque. The low hills of Inner Lobos (Lobos de Terra), which is about 28 miles (seven leguas) off the coast, can be seen from the mainland in clear weather, but Outer Lobos (Lobos de Afuera) lies about 40 miles out to sea and about the same distance to the south of Inner Lobos, so it cannot be seen from either.

Morrell (*Ibid.*, p. 120) wrote:

"The Indians from the continent visit these islands every year, for the purpose of sealing and fishing, and gathering eggs, which they sell on the main. They come hither on a kind of raft, ... This craft is composed of a number of large logs of a light and buoyant nature, lashed together with cordage made of a certain species of grass. They are generally from twenty to twenty-five feet in length, and sometimes even fifty feet. ... I have seen them fifty miles from land. This is the only way the Indians transport their produce to market at the different towns along the coast."

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[1] A brief mention of the balsa rafts by Rowe (1946, p. 240) differs merely in his description of the mast, which seems to refer to a type occasionally found in Peru: "The real limitation to Peruvian navigation was not lack of ingenuity but lack of convenient supplies of suitable lumber. From Payta in northern Perú to Manta in Ecuador, the Indians built large seagoing balsa-wood rafts, which were among the most seaworthy craft in all South America. They laid out seven to nine balsa-wood logs of graded lengths, so as to make a pointed prow and square stern, and lashed them together with lianas and cords. A platform was built on top to keep the cargo dry, and a mast was stepped in the middle log. These rafts had sails and oars, and were large enough to carry 50 men." (As his sources Rowe refers to Cobo and Estete.)

The mast described by Morrell differed also somewhat from the usual bipod system, since it was single, and stepped in the centre bottom log, where it was secured by "a kind of a box, three or four feet in height" raised in the middle of the raft. Morrell evidently observed no other device for steering than a successful interplay between the square sail and the large steering-oar visible astern; but the fact that these rafts must also have used under-water centre-boards—and even to such an extent as that which had provoked Juan and Ulloa to their study of the *guaras*—seems more than obvious. For Morrell declares that the rafts he met at sea were "steered with large wide-loomed oars, which are shipped on the after end of the logs, about two feet high. They will beat to windward like a pilot boat, ..." Obviously, irrespective of the size, shape, or handling of the sail and the steering-oar aft, no flat-bottomed log-raft will beat to windward unless it has also got centre-boards, and unless the crew furthermore knows how to handle these in a very specific manner.

The same writer also states that besides these log-rafts the Indian fishermen along the same coast also use "an ingeniously constructed machine, somewhat similar to the life-buoy," and we learn that this highly seaworthy construction was manufactured by skins sewed together and filled with air. "Two of these wind-bags are lashed together, and a small board placed across them in the centre, on which they sit to paddle. Embarked on these airbubbles, they will pass through a very heavy surf with the greatest ease and safety."[1]

Morrell does not mention having met the reed-boats at sea, and states that the inflated skin-pontoons were principally used in fishing along the coast, whereas the aforesaid log-rafts were used for parties navigating the open sea. He also says of the two Lobos islands:

"The Indians sometimes visit these islands in large parties, on fishing excursions or frolics; and frequently stay three or four weeks. I have always found them to be very civil and accommodating; having frequently received kind offices at their hands, such as presents of fruit, vegetables, & c. from the main. They always bring their fresh water with them in these catamarans, as there is none to be found on the islands, which are covered with sand, rocks, and the dung of aquatic birds: the latter sufficient to load thousands of ships, having been accumulating for untold ages. It is called guamar [*guano*] by the Spaniards, and is probably the richest manure in the world."

It is highly important to note that large parties of Indians left the coast in this manner, carrying with them enough food to provide casual European ships with their own surplus from the mainland, and taking on board the rafts a fresh-water supply to last them for weeks.

The existence of guano on the various islands, and its value as a fertilizer was well known to the Indians of aboriginal Peru. Stevenson (1825, Vol. I, p. 357) and Hutchinson

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[1] Frezier (1717) who describes and illustrates these remarkable inflated seal-skin vessels from further south on he same coast (Arica), found them suited for entering surfs and seas in which no European lifeboat would survive.

(1873, Vol. II, p. 131) demonstrate with the early chroniclers how the Indians sailed out to the islands to dig guano and take it back to the mainland. Hutchinson quotes Garcilasso (1609, Bk. V, ch. viii) who, speaking of the guano to be found on the Chincha Islands off the Paracas peninsula, south of Callao, states that each island was set apart by the Incas for the use of a particular province on the mainland of Peru. Hutchinson also points to the ancient idols which have been found on these islands, at great depths beneath the guano. Schmidt (1929, p. 89) says about the balsa rafts in the same connection: "According to Oviedo's description, they were provided with a deck fore and aft and a big hut for storing goods. When we consider the fact that extensive land areas of Peru were, during the Inca rule, manured with the guano from the coastal islands, then these sea-going vehicles must be credited with great economic importance as a means of transport."

In his recent study of "Pre-Spanish Navigation Off the Andean Coast", Means also (1942, p. 3) takes up this evidence of spacious and sturdy craft capable of transporting burdens by sea. Referring to Cieza de Leon, he moves still further down the coast and says: "He informs us that the Indians of the southern part of the Peruvian coast (in what is now northern Chile) were wont to go in craft which he calls *balsas* to certain off-shore islands in order to fetch the dung of birds which congregate there by the million. This was the guano for which agriculturists have been grateful to Peru from early times down to our own day. In using *guano* as a fertilizer for their fields the pre-Spanish Andeans displayed their great wisdom as farmers. Unfortunately, Cieza does not describe the *balsas* used in carrying to land the precious if not perfumed material."

But we are not left with much choice as to the type of craft used for this early transportation. As Means (*Ibid.*, p. 14) himself concludes, "we deduce that, in pre-Spanish times and later, the people of the Andean coast had only three principal kinds of boats, not counting types used as the result of Spanish influence. These were: 1. Reed-boats; 2. Sealskin boats; 3. *Balsa*-log rafts with sails and paddles. Of these three kinds of early boats the most elaborate and least inefficient was unquestionably the *balsa*-log raft."

The early Peruvians were too intelligent, and too well organized, to use anything but their most efficient craft for transporting this dung to their various provinces. They would not sit with guano almost in their laps while paddling up and down the coast kayak-fashion in reed-boats or sealskin floats. We recall that Inca Garcilasso, who also speaks of the guano transport along the Peruvian coast, explicitly said of the local mariners along the same aboriginal stretch: "*When they want to convey large cargoes they use the rafts of wood.*" The absence of timber on the desert coast where the guano was to be hauled was no obstacle. If the inland culture-people had intelligence and ambition enough to obtain fertilizer from islands out in the ocean, their mariners who carried out the transport would also be able to obtain the necessary balsa logs from their own forest land higher up the coast. Since it was possible in early Peru to import such cargo by sea, it should also be possible to import by sea the moveable craft on which the cargo was to be carried. Until fifty years ago the Indian fishermen of Sechura and the desert coast south of Paita still imported their own balsa logs by sailing them down from the forest area higher up north, and Knoche (1930 a, p. 309) says: "Ramshackle log-rafts with simple sails, such as were known along the whole west coast since early ages, do still in our days travel northwards in the favourable season, that is during the summer. They sail with the South- and Peru-

Current from Southern Chile and Chiloé Island northwards to the guano coast, and as far as to Callao in Peru, where the lumber obtains a good price."

Various prehistoric artifacts have been found many feet beneath the surface since the modern guano companies began to work on the islands off Peru, thus affording archæological support to the statements of the early chroniclers. Such interesting vestiges are known both from the Chincha Islands off Paracas and the Guanape Islands some 150 miles south of the Lobos. Ratzel (1885—1888, Vol. III, p. 666) calls attention to what he terms the "conspicuous parallels" between the Old-Peruvian wood-carvings excavated from the guano of the Macabi Islands, and the historic wood-carving from the Hervey and Marquesas Islands. It remains indeed to be shown that these parallels represent more than a casual similarity. If this can be done, it certainly does not indicate that proto-Polynesians visited these guano islands from Polynesia, but rather that they, or related people, came there while living on the neighbouring coast of Peru.

We thus find that, in spite of the absence of water on the islands off the coast of Peru, the Indians utilized these island territories as much as modern man is able to today. The only inhabitable island near Peru is Puna in the Gulf of Guayaquil, and the inhabitants of this island were certainly not isolated from hostile mariners, who arrived regularly from the mainland in flotillas of balsa rafts.[1] Further out at sea is Santa Clara Island, uninhabited, but well known to the Tumbez merchants captured by Ruiz; and the Spanish discoverers, as we have seen, also found signs of Indian sacrifices on the island.

Further north, some twenty miles off the Ecuadorian coast near Manta, lies La Plata Island. Here the Spanish explorers "found textiles, objects of silver, etc." when they first advanced towards the Inca Empire in 1527. (Murphy 1941, p. 26.) About the same latitude, but 500 miles out into the open ocean, lie the Galapagos Islands. These islands, with their dry-land vegetation, were entirely unoccupied in prehistoric times, not probably because of their isolation, but because of the lack of fresh water supply, which made aboriginal habitation extremely unfavourable. As Skogman (1854, Vol. I, p. 164) points out, the Galapagos Islands are known to have been visited by balsa rafts in historic times, so we may well assume that they may have been visited in pre-European times also.[2]

It is true that no vestiges of prehistoric stonework and permanent habitation have been discovered on the Galapagos Islands, but this is no argument against temporary visits by balsa rafts with fishermen or exploring merchants. When prehistoric visitors made a temporary camp, there were no durable materials like empty cans or bottle-ends to be disposed of, and they did not leave a trail of polished stone blades, potsherds, or other artifacts behind them. There is only one clue which may indicate that the land was used to a limited extent in prehistoric times. Sauer (1950, p. 536; see also Hutchinson *et al.* 1947, p. 102; and Carter 1950) shows that: "The endemic cotton of the Galápagos has been reduced to a variety of *G. barbadense*." *G. barbadense* was never a wild plant, but, according to the same authorities, a culture product raised and domesticated by the aboriginal civilizations in northern Peru.[1] How this cultivated variety of dry-land Early Chimu cotton, which is not dispersed by ocean currents or by birds, should have become established out on the Galapagos Islands is at least a fascinating question.

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[1] See also Zarate 1555, Ch. VI. Xeres (1534, p. 14) said of Puna when discovered: "It is fertile and populous, and contains many villages, ruled by seven chiefs, one of whom is lord over the others."

[2] Skogman, who observed the coastal traffic of Paita and Guayaquil a century ago, describes the balsa rafts seen by him as up to 60 and 70 feet long, with the length of the logs decreasing towards the sides. On a central platform there was a little house for the crew. They had the bipod mast, but a triangular sail. The navigation was done by a steering-oar astern, and to prevent leeway drift, centre-boards, a foot or two wide and up to three or four yards long, were sunk down in openings near each end of the central logs. "Quite long journeys are undertaken with these vessels along the coast, and even out to the Galapagos Islands."

About five hundred miles northeast of the Galapagos and a little less from the Panama Isthmus lies lonely Cocos Island. We have already dealt with the remains of native plantations on this island. Cook (1910—12, pp. 294, 340) said: "The presence of large numbers of coconuts on Cocos Island in the time of Wafer (1685) and their subsequent disappearance should be considered as evidence that the island was formerly inhabited, or at least regularly visited, by the maritime natives of the adjacent mainland." Further: "Ethnologists may find in this hitherto unsuspected primitive occupation of Cocos Island an additional evidence of the maritime skill of the Indians of the Pacific coast of tropical America, and thus be the more willing to consider the possibility of prehistoric communication between the shores of the American Continent and the Pacific islands."

On the shore of the continent as close to Cocos Island as to Galapagos, and due east of the latter group, lies the Manabi area of Ecuador. This is, according to Inca traditions, the coastal territory where Tici and his Viracochas left the mainland. Murra (1946, p. 804) has this to say about the local aboriginal tribes and their "Boats and trade": "All observers seem to agree that the maritime peoples of Manabí were great sailors, skilfully handling dugout canoes and elaborate balsa rafts on fishing, commercial, or ceremonial trips." He indicates an early headquarters of the coastal traders in this region, and adds (*Ibid.*, p. 805): "...but it seems fairly obvious that the florescence of such commerce must have received its impetus from the south."

Going further north we find that nearly all the islands off Colombia and Panama were either inhabited by island Indians or else showed signs of prehistoric habitation. With reference to the Gulf of Panama and its island tribes, Linné (1929, p. 212) writes: "We know the Indians of the Pearl Islands were capable sailors, but on the coast the inhabitants do not seem to have been very good seamen." This is probably true, but there were exceptions, for Lothrop (1942, p. 258) shows how canoes each holding seventy men were built by the coast Indians on the Azuero Peninsula of Panama, near Coclé, and how Bartolomé Hartado and his troops in 1517 made use of these large native craft on an off-shore voyage of more than three hundred miles to the northern part of Costa Rica. He concludes (*Ibid.*): "Because of their ability to build and navigate such large vessels, the natives clearly had a rapid means of access to distant lands."

The old record that Peruvian sailing-rafts and llamas were known to the pre-Columbian natives of Panama and described to Balboa in 1512 before the latter had yet 'discovered' the Pacific Ocean, has been pointed out by Friederici (1907, p. 73), Schmidt (1929, p. 89), and Lothrop (1936, p. 74). The latter has found supporting evidence in his archæological studies of Central America (1936; 1937; 1942). He describes the discovery at Coclé of what he terms "products of direct trade relationships with Colombia and Ecuador," and cultural evidence which even made him speak of "contacts with other areas, including direct commercial ties with Yucatan and Peru..." (Lothrop 1942, pp. 251, 253.) Linné (1938, p. 169) has also discussed the many indications of sporadic trade and inter-relations between Mexico, Central America and South America as far as Peru in pre-Columbian times. Pointing first to the existence of several rather early common culture elements in these areas, he shows with Lothrop and others that the Peruvians seem to have been carrying trade far up the coast even in periods shortly before the Conquest.[1]

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[1] Silow informs me (in letter dated January 29, 1952) that the wild Galapagos cotton—formerly regarded as an endemic species and referred to as *Gossypium darwinii*, but now identified as *Gossypium barbadense* var. *darwinii*—is a product of local isolation which has caused a certain differentiation from *Gossypium barbadense* proper. He adds: "On that basis the intergrading series now observed in the Galapagos is probably the result of hybridization between var. *darwinii*, the product of that earlier isolation, and more recently-introduced forms of typical *G. barbadense*." The Galapagos cottons "have spinnable even though not particularly attractive lint, and we certainly do regard it as possible that they were transported by man from the American continent, ..." (*Ibid.*)

Although we have reason to believe that the coastal craft of aboriginal Peru was a culture element of no mean importance up to the advent of European ships and the local disturbances which then followed, and although we have reason to suspect a casual traffic by Peruvian sailing rafts as far north as Panama, yet we have little evidence to suggest that Peruvian merchants carried on regular trade relations with the territories north of Panama. In a recent paper on "Pre-Columbian trade between North and South America", Chard (1950) has shown that a considerable number of modern anthropologists (Dixon, Harcourt, Jijón, Joyce, Kidder II, Kroeber, Lehmann, Linné, Lothrop, Nordenskiöld, Rivet, Saville, and Verneau) have found evidence of trade between the former Inca Empire and Mexico or Middle America, but the archæological material in support of these claims is not rich enough to argue anything like regular or important trade relations between North and South America.

Archæological centre-boards

Gretzer (1914), in a short paper on navigation in ancient Peru before the discovery, seems to be the first to draw conclusions from the existence of prehistoric centre-boards in desert graves of South Peru, hundreds of miles away from the northern forest country. During a residence of 33 years in Peru he carried out a series of important excavations, most of which went to the Völkerkunde Museum in Berlin. Gretzer (*Ibid.*, p. 7) calls attention to the elaborately carved paddles which he found in several of the ancient Peruvian desert graves, and adds: "These, and *guaras* or centre-boards intended for steering rafts, are frequently found as grave-goods in the valleys of Pisco and Ica."

A photograph of a prehistoric Peruvian centre-board under excavation by Gretzer is reproduced here in Plate LXXVI **2**. As commentary to another illustration the same author says: "In the background are seen some Algarrobo-trees, which have a very solid and hard wood; from this wood the ancient natives manufactured the artistically carved paddle-oars and centre-boards."

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[1] He adds: "From the coastlands of Peru and Ecuador we have legends of invasion from the north, and not of the character of myths, but rather of tradition, although they are vague. ... It may well be conceived, at any rate theoretically, that offshoots of the high civilizations in the north and in the south might in Panama have come into contact with one another. The large sail-fitted raft, carrying merchants and trade goods, that Bartolome Ruiz in 1526 met off the coast of Ecuador on his first advance on Peru, was northward bound." In an earlier publication (1929, p. 273) Linné, citing Nordenskiöld, is certain that bronze, when acquired in Central America and Mexico shortly before the era of European discoveries, came from western South America. Also Rydén (1949) holds that the rafts met by the Spaniards probably had Central America or Mexico as their destination. "Archæological discoveries do also speak in favour of a connection across the sea in this direction."

The very elaborate ornamentation on some of these raft accessories leads Gretzer to believe that they must have been carried about during festal processions. In such a case they would probably be commemorations of important maritime events, and the author suggests that the ancestors of the aboriginal culture people originally came southwards along the coast. He adds: "The question now arises: were larger craft known to the oldest inhabitants of South America, that they were able to undertake longer journeys on the ocean? This question may definitely be answered in the affirmative..." Gretzer next quotes the balsa-raft study of Juan and Ulloa, and goes on to say:

"This description of the vessels or rafts tallies completely with that which we were given during Pizarro's first voyage of discovery in 1525, and, indeed, there is hardly any doubt that we are here confronted with a craft such as was known perhaps already in the earlier Tiahuanaco period. For we find already in graves from that period the trading-shell *Spondylus pictorum Ch.*, which does not exist on the coast of Peru.[1] The shell depicted here [see his figure] from the Tiahuanaco period comes from my second collection, found at Pachacamac (*Museum für Völkerkunde*, Berlin). The shell would be carried on the chest. ... The figure, which in any case represents a deity, is placed on the external side of a *Spondylus pictorum*, and is pieced together in mosaic from mother-of-pearl, malachite, and other coloured stones and shell-pieces. Legs and head are prominent, as we recognize the central figure on the monolithic gateway at Tiahuanaco; we also see the typical serpent and puma heads of this period on the poncho. ... A twisted snake with two heads, of inlaid work, is furthermore placed under the deity."

The number of centre-boards that have continued to come from ancient graves in southern Peru is inexhaustible, and although little comment has generally been made on what they actually represent and what they imply, their often artistically carved handle section has made the best specimens a familiar sight in most museums and private collections specializing in Peruvian archæology and ornamental art.

In 1932 Lothrop, in his interesting survey of aboriginal navigation off the Pacific coast of Peru, called attention afresh to the centre-boards which at that time were still exhibited in some museums as aboriginal Peruvian "paddles", "rudders", or even "carved wooden slabs". He showed (*Ibid.*, p. 240) the correspondence between the archæological specimens from the desert graves in South Peru and the historically used *guaras* on the Ecuadorian balsa rafts of the forest area to the north, and realized that centre-boards were a direct criterion of the sort of vessel which had been employed. "In the first place", he wrote, "it is obvious that a centre-board is useless unless a vessel has sails." Here Lothrop pointed to a very essential piece of evidence. *Caballitos*, small reed rafts, sealskin pontoons, and the rare coastal dug-outs were all propelled by paddles only, and would neither need nor be able to benefit from *guaras*, which were only workable from sailing craft. Garcilasso and other early chroniclers have pointed out that the only coastal craft which went under sail in early Peru were the wooden rafts used for navigating the sea. Such then, were the craft employed by the people who left behind the *guaras*.

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[1] The historic distribution of *Spondylus pictorum* is from Scammon Lagoon, Lower California, to *northern Peru*. (Letter to the author from Prof. Dr. H. Broch, July 21, 1951.)

In the same survey Lothrop (*Ibid.*) pointed out: "Paddles on the coast of Peru were of three main types. One kind was made by splitting in half a large section of bamboo. According to Garcilasso they were used to propel the *Caballitos*, and the paddlers gave strokes alternately on each side. ... A second kind of paddle is so short that it also must have been used on a *Caballito*. ... Paddles from southern Peru are... all over six feet long, and either the crew stood erect or they must have propelled a vessel of fairly large size. The elaborate carving on some examples has given ground to the belief that they were ceremonial rather than utilitarian, and it has been suggested that they served as ceremonial spades. Their size, however, would preclude their use as spades, while the evident signs of wear on the blades indicate that they were utilitarian. Even the most intricate examples would stand a good deal of knocking about, for they are carved in a very hard wood."

Since the early Peruvians can hardly have made their hard-wood paddles so long that they required to stand to paddle on small and cranky floats, we may assume that the sturdy paddles, like the centre-boards together with which they are found, were accessories to wide, good-sized sailing-craft with a slightly raised deck platform.

During his travels the present author has had the opportunity of examining a great number of prehistoric Peruvian centre-boards. None have been carved with such elaborate ornamentation as to be unserviceable for regular use, and exceedingly few are made unhandy by excessive carving, provided they were used between the spongy logs of a balsa rafts. A series of centre-boards from southern Peru is reproduced here in Plates LXXIII—LXXV. The *guaras* of LXXIV and LXXV are so plainly utilitarian that they would never be suspected of being ornamental objects to be carried about in a procession; they have been cut and dressed by common unpretentious sailors or merchants for use in steering their Pacific sailing-rafts. The *guaras* in Plate LXXIII show a variety of ornamented specimens, and an analysis of the placing of the decorations tells us much. The carving is concentrated on the handle and the upper section, whereas the entire blade is plain and undecorated. The blade is the only sextion to go between the logs and into the water; the handle portion projects above deck and is not merely the only visible part, but the only one free from touching the logs of the raft. The handle of the centre-board is not to be held tightly, nor pressed and twisted like a paddle-handle; it must simply, at certain moments, be pulled slightly upwards or lowered down.[1]

Let it also be borne in mind that the most elaborately carved *paddles* are generally left plain on the one side which scrapes along the side of the raft, and the hard-wood of which they are wrought can stand up to considerable bumping against the soft balsa wood. There is also another consideration: a sailing-raft large enough to use centre-boards is not a one-man craft, neither is a vessel which requires six-foot single-side paddles. As previously emphasized, such a craft was the property of some chief, merchant, or other wealthy member of the community. On the death of one of his crew he would hardly

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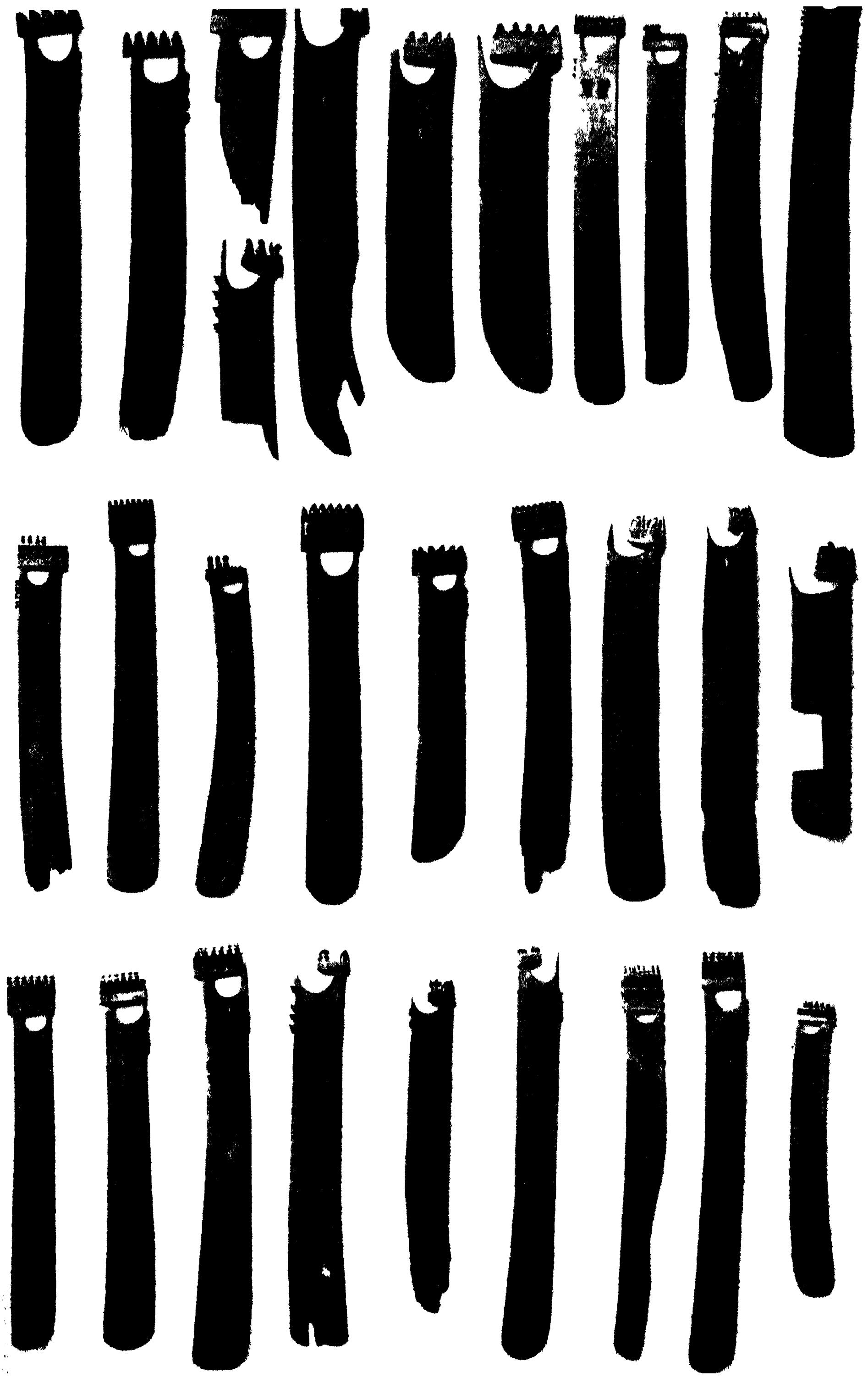
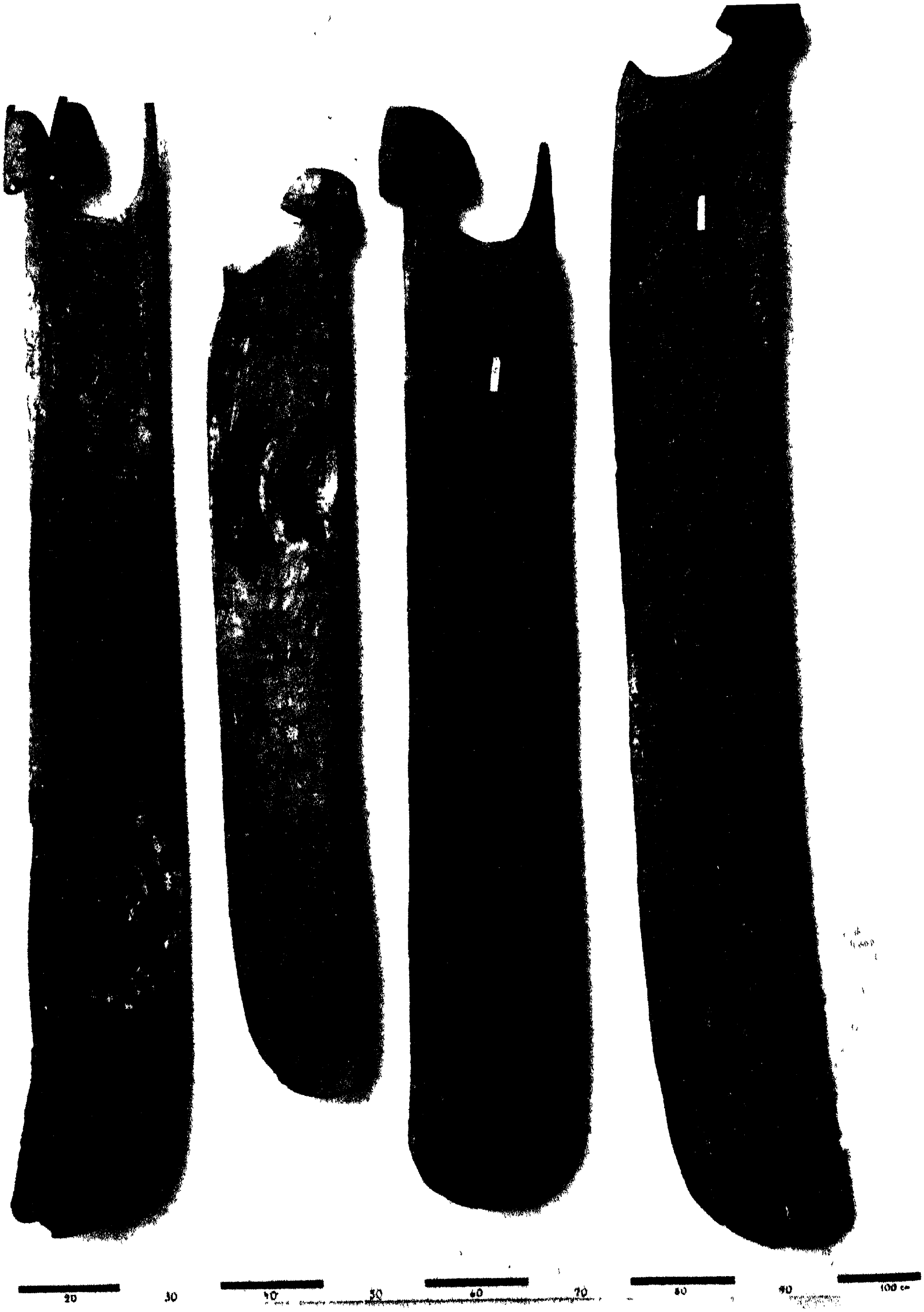
[1] The limitation of the carving on the centre-board to that part which would be visible at all times above the deck would indicate either that the carving was done at leisure when the board was in use at sea, or else that the carver ashore intentionally limited his work to the part which he knew would be visible and unscratched when the centre-board was inserted in its proper place on board. The beautiful carvings on the centre-boards at Pisco and Ica made them art treasures worthy to accompany their owners in the grave, and this will probably explain why they were not discarded like the big, plain raft itself.

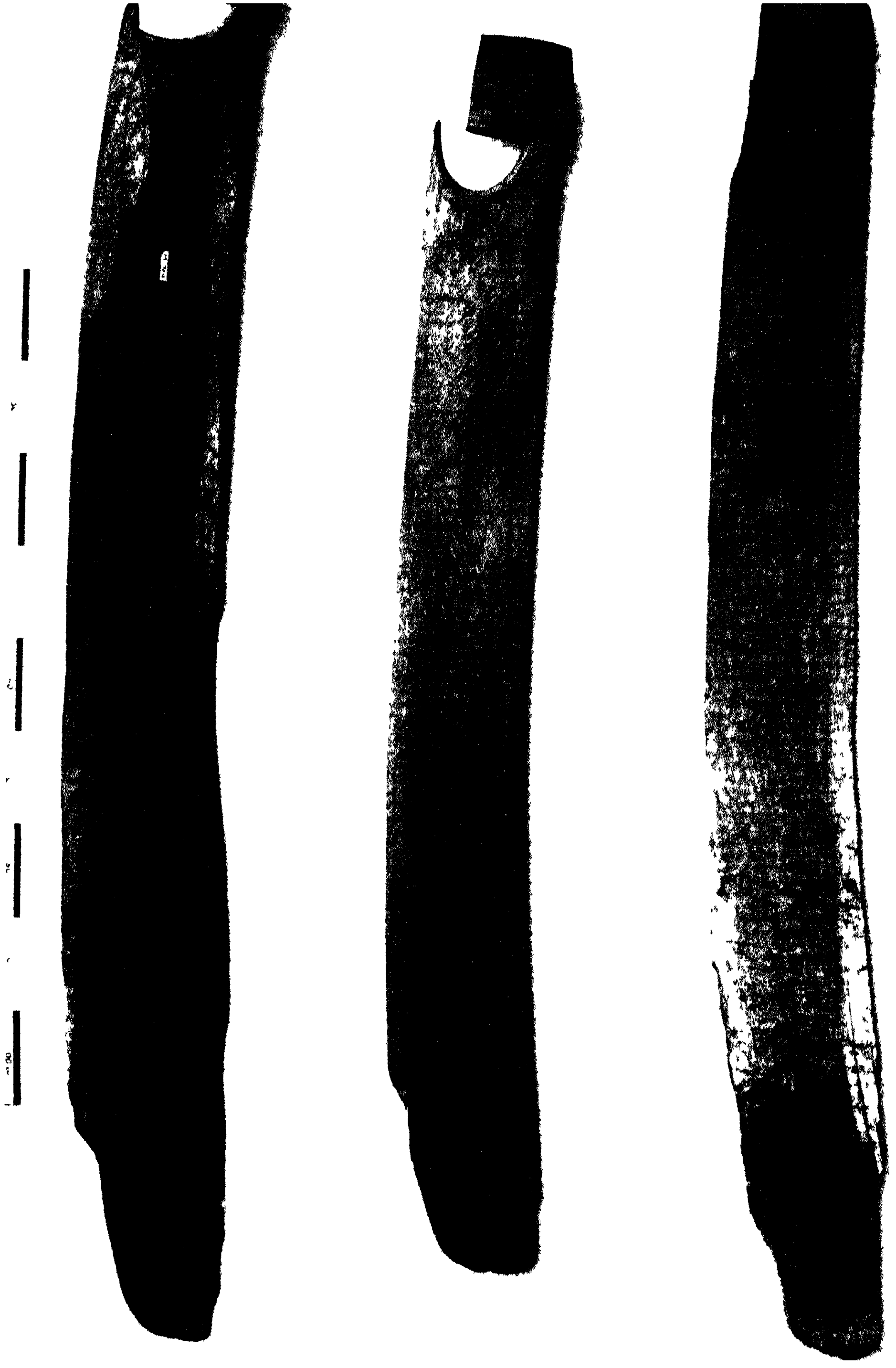


Archæological centre-boards from tombs in the Ica area of the southern Peruvian coast. (Photo: *Mus. f. Völkerkunde, Berlin.*) The centre-board was an early prehistoric invention in the New World, first observed by Europeans on the South American balsa rafts, and only imported into Europe about 1870.

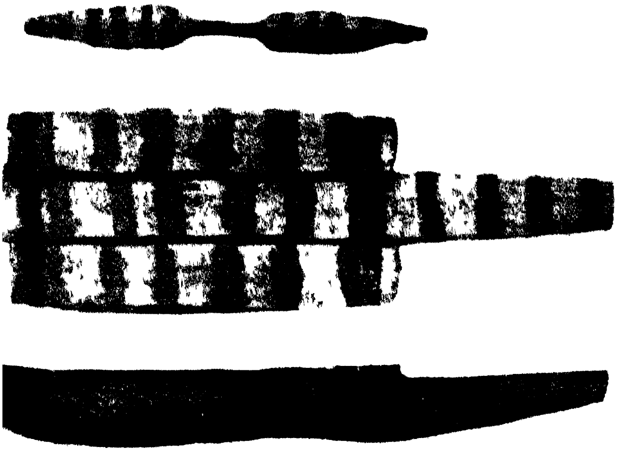
LXXII



Prehistoric and strictly utilitarian centre-boards from the Pacific coast of southern Peru. (Photo: *Mus. f. Völkerkunde.*) The size and nature of a balsa raft does not make it suitable as a grave gift, but the hard-wood centre-boards are common in the early coastal tombs.



Accessories to sailing-rafts. (Photo: *Mus. f. Völkerkunde*.) These plain centre-boards from prehistoric Peru are in themselves sufficient to prove the local use of log-rafts with sail, for: a) they are of no use on the local canoes and reed-boats, and b) centre-boards cannot be used except in combination with sail.



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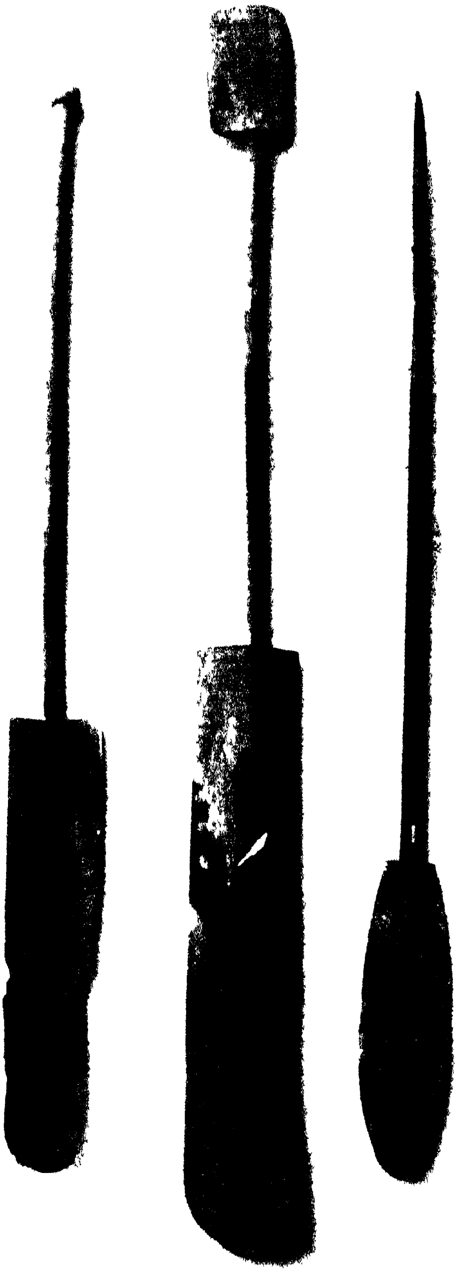

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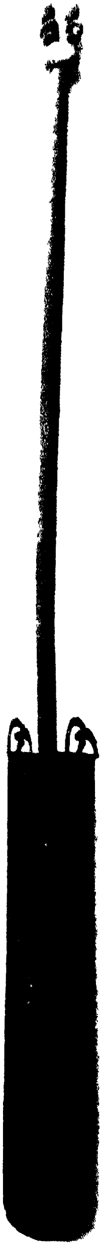
[illegible] prehistoric model raft (spirit raft?) with paddle, from a grave at Arica. Such miniature rafts, lashed together by ropes or by strips of seals' skin, and averaging about 1 ½ foot in length, are frequently found in local coastal graves from the first centuries A. D. (From *Bird 1943.*) **2** Prehistoric centre-board under excavation near Ica. (From *Gretzer 1914.*) **3** Large archæological raft paddles from the coast of South and North Peru. (Photo: *Mus. f. Völkerkunde.*)



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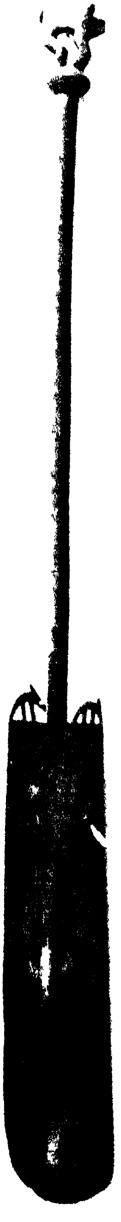

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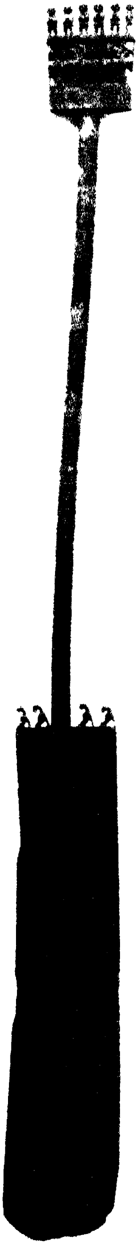

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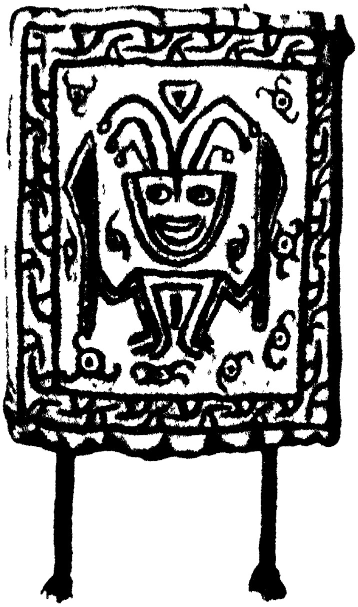

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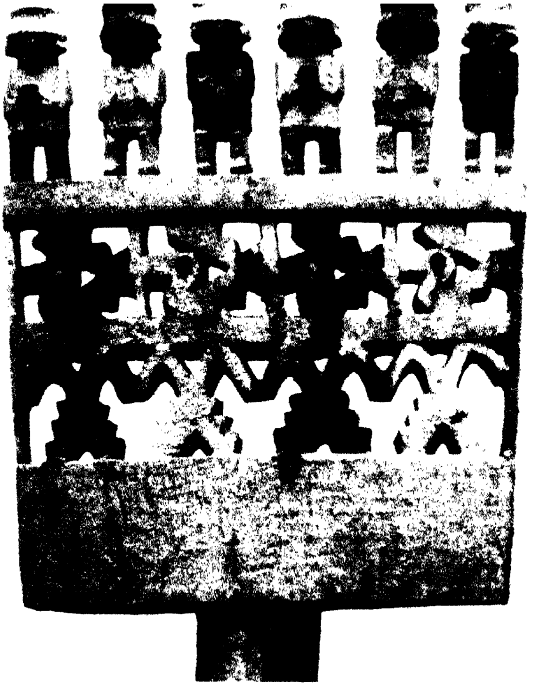
1-3 Large ornamented raft paddles of hard wood from prehistoric Peruvian graves. (Photos: 1, 2 *Mus. f. Völkerkunde*; 3 *Mus. of the Amer. Indian, Heye Foundation, N.Y.*) Such paddles were only used on greater rafts, and possibly by chief navigators as badges of rank. The small and rank one- or two-man *caballitos* were propelled by double-bladed paddles. **4-7** Grave tablets in the shape of miniature sails (spirit sails?) of reed and cotton cloth. Common in prehistoric tombs near Ancon, Peru. (From *Reiss and Stübel 1880-87*.)



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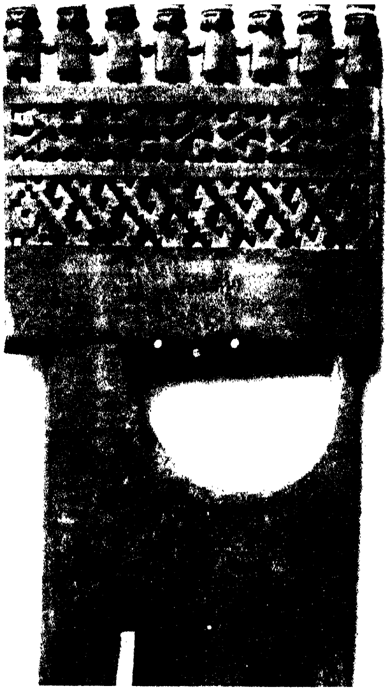

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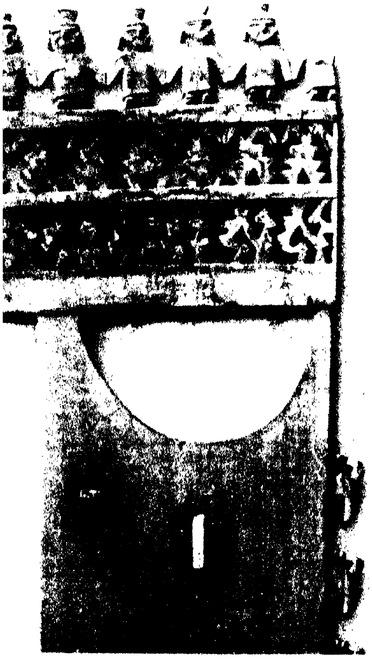

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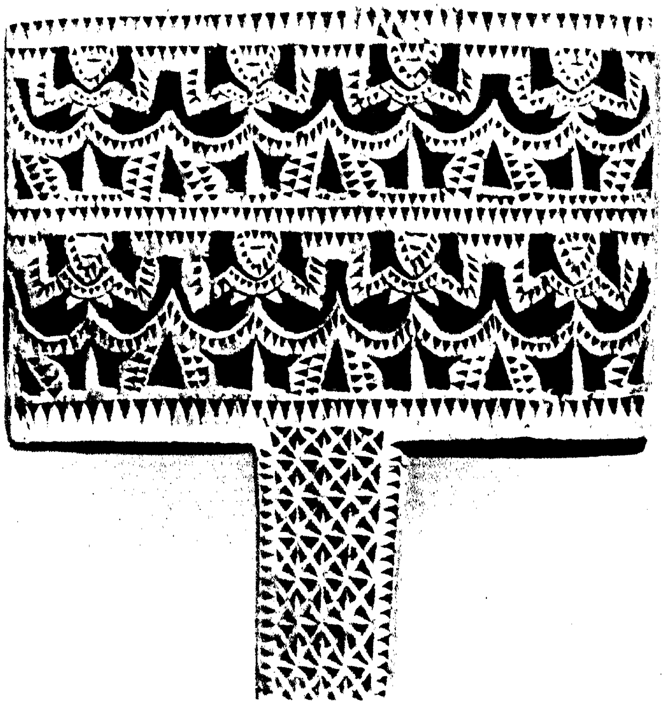

4

1 Ornamental paddle handle, and **2, 3** ornamental centre-board handles from prehistoric southern Peru. (Photos: 1 *Mus. of the Amer. Indian, Heye Foundation*; 2, 3 *Mus. f. Völkerkunde*.) **4** Conventionally decorated handle of ceremonial paddle from Polynesia, as used until historic time. (From *Best 1925 a.*) Note the analogies in position and execution of pattern, and in the symbolic and decorative motive composed of rows of men holding hands. The rows of men on the island specimen are greatly stylished.

remove one of the utilitarian centre-boards and deposit it in the grave of the employee to whom it did not belong. At his own death, however, the captain would be likely to have his own favourite paddle and centre-board placed beside him. Burials such as the latter would obviously leave us with specimens of finer decoration than those on the ordinary sailor's paddle and centre-board. It is possibly, too, that the captain took such a minor part in the manual labour on board that his own tools in many cases served chiefly as ceremonial badges. Ceremonial paddles are not unfamiliar in certain parts of Polynesia, and the frequent and familiar ornamental paddle-grip reproduced in Plate LXXVIII **4** is not very unlike those under discussion, even in its peculiar motive.

The large hard-wood paddles and, even more so, the peculiar centre-boards which have been excavated from the early graves in the neighbourhood of the Paracas Peninsula and Ica, have come down to us as a silent testimony of past maritime activity and skill in this part of Peru, even in periods antedating the Inca domination of the coast. We can never get better archæological evidence, since the raft itself is too large and unsuitable to be buried together with its owner. Nor would the spongy balsa wood be ornamented like its hard-wood centre-boards and paddles, and it was thus probably decomposed for *caballitos*, or left to deteriorate or serve as fire-wood, when the logs were too old for further use.

Leicht (1944, p. 22) points to a very ancient navigational skill in pre-Inca Peru and suggests an original coastwise emigration of culture people by sea from somewhere in Central America down to the Chimu area. He also points to the archæological evidence of paddles and steering equipment with grips carved with the youthful freshness and the naturalistic style characteristic of the early coastal people. "These signs of an early seafaring activity were found in the south at Pisco and Ica," he says, "and they throw an important light on the obscurity which surrounds the origin of the cultures on the southern coast of Peru, even outside the scope of the later Chimu empire."

The model rafts of Arica

On the Pacific coast below Tiahuanaco, further south than Pisco and Ica and just across the border of the present-day republic of Chile, lies the famous necropolis of Arica. In the various phases of Peruvian prehistory there have been migrations or intertribal trade, to a more or less evident degree, between the culture-people on this coast and their highland neighbours of the Uru-territory near the southern end of Lake Titicaca. In the latter part of the last century, during his excavations among the numerous local sand-graves, Uhle (1889, Pl. 25) came across a little vessel which he thought was a toy raft (*Balsa als Kinderspielzeug*). Subsequently several of these tiny wooden rafts were discovered in neighbouring graves, some of them with the tiny logs still securely lashed together. (Skottsberg 1924, p. 43; etc.) As an increasing number of these tiny log rafts came to the surface and spread to museum collections in the New and the Old World, it became clear that we were confronted with something more important than a child's toy, especially since a number of rafts were definitely found in adult graves and associated with fishing gear and other property of adult males. The current terminology for these small vessels, therefore, gradually changed from "toy rafts" to "model rafts". (Bird 1946, p. 592.)[1]

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[1] Bird (*Ibid.*) says of the burials at Arica: "With the males, both adults and children, are model rafts and paddles."

From the same early pre-Inca burial ground Uhle (1922 b, p. 49) also describes a model boat fitted with sail and containing the mummy of a foetus; and this, in addition to the many other small vessels in the adult graves, strengthened the case for some sort of "spirit ship" rather than a utilitarian boat-builder's guide. The little mummy boat described by Uhle is not, like the general type, made of wood, nor is it composed of bundles like a reed raft, but it is shaped like an open boat's hull made up of a framework of parallel reeds superimposed and lashed on one above the other, to each side of the central concavity. The peculiar craft is slightly reminiscent of the open cane or reed rafts sometimes made with a frame of canes or branches by the Chatham Island Morioris; they too believed firmly in the building of miniature spirit ships, *waka ra*, which they set sailing in the track of the sun. (Shand 1871, p. 354.) Uhle thus describes this miniature Arica vessel, of which he gives a very indistinct photograph (*Ibid.*, Pl. IV, fig. 2): "Model of a boat, stitched of two little mats of totora-reeds in the middle and provided with another little mat of totora which served as a sail.[1] ... The sail covered the mummy in the form of a roof, about 30 cm [one foot] long."

The sail—like those which have survived inland from Arica on the prehistoric type of reed-boats at Lake Titicaca—was composed of a single layer of totora reeds superimposed to form a mat. It was square in shape and held together by four vertical rows of stitches. Uhle gave it the date of the first centuries A. D., and not later than 300-400 A. D. (*Ibid.*, p. 67.) In this connection Nordenskiöld (1933, p. 265) writes: "The sail was probably known on the Peruvian coast earlier than pottery and weaving, and is, therefore, very ancient, as is evident from Uhle having found a toy vessel fitted with a square sail in a grave from the primitive fisher population at Arica."

No sail is found on the general type of model wooden rafts buried in adult fishermen's graves at Arica, and a further analysis of these small craft will tell us why. They are all formed of three miniature logs lashed together, the longest in the middle, exactly like the *caballitos* drawn by Benzoni (see Plate LXV) from the coast of north Peru. With these miniature *caballitos* from Arica are also buried miniature paddles, and their shape, with a blade on each end, confirms our suspicion that the models actually represent narrow three-beam rafts on which the fisherman sat astride alone, paddling alternately on each side. (See Plate LXXVI **1**.) As we know, such crank *caballitos* could not go under sail; they were one-man craft and the personal property of each individual fisherman. It hence follows that these were the craft selected to accompany the *individual* in the grave.

Through a curious burial custom at Arica, we have learnt what written history has failed to tell us, that the three-beam *caballitos*, as well as the square reed-sail, were known on the coast below Tiahuanaco at the time of the early Tiahuanaco civilization; also that the same wooden log-raft had a wide prehistoric distribution along the Pacific coast of Peru, ranging from the borders of the present Ecuador in the north to the borders of the present Chile in the south. Since the three-beam log-raft in the north was closely associated with five-, seven-, and nine-beam rafts, we may suspect that the larger form was also present in early Arica, especially as it would obviously have better facilities for diffusion up and down the coast. Apart from this, a minimum of brain was needed to develop the mere size of an existing log-raft by adding two more beams. We also know from Gretzer's *Spondylus pictorum* that distant trade was carried to this southern area in the Tiahuanaco period, for which purpose the individual fisherman's three-beam log-raft would be insufficient.

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[1] The original text: "Modelo de bote, cosido de dos esteritas de totora en el medio y provisto de otra esterita de totora que le servía de vela."

We may, however, draw more interesting detailed information from the pre-Inca model rafts at Arica. The early chroniclers have given us the enormous size of some of the Peruvian log-rafts, and specified the odd number of logs from which they were lashed together. But none of them apparently investigated the way in which the slippery wood and lashings were held in place, and how the logs were shaped. This we learn from the Arica model-makers who were familiar with the principles a thousand years or more before Pizarro's time. Measuring the shorter outer logs of one of these model log-rafts at 36 cm long and 9 by 6 cm in cross section, Bird (1943, p. 227) points out: "On the outer and bottom surfaces at each end deeply cut grooves serve to hold the lashings." He says in another passage (*Ibid.*, p. 224): "*Model Balsa Raft.* Forty-one centimeters long, with side pieces twenty-seven centimeters long and the width across the deck eleven centimeters, this model balsa raft was originally bound together with rawhide thongs, fitted into notches cut in the outer edges of the side logs. The deck surface is cut flat and painted with red stripes. The under surface of the logs is faired away, fore and aft, to reduce the water resistance."[1]

"*Spirit Sails*" *at Ancon*

Only through analogy with the reed-sails of Lake Titicaca and the miniature sail described by Uhle may we see a possible explanation of the peculiar artifacts reproduced in Plate LXXVII **4-7**. A great number of such objects have been found in graves at Ancon (Reiss and Stübel 1880-87, Vol. I, Pl. 32, 33) and Chancay (Wiener 1880, pp. 650, 651) on the coast north of Callao. Reiss and Stübel describe them as "some of the most remarkable grave-gifts" in that area, and explain how they are all made of parallel bits of reeds lashed to cross-sticks and covered in front by cotton cloth, generally square in form, and always attached to a longer stick which extends slightly above the mat, while generally extending farther at the lower end. The base of this mast is usually planted in the ground near some mummy, or else a bundle of them is merely wrapped up inside the grave. The authors question whether these were intended to beautify the tomb, to chase away evil spirits, or to symbolize the rank and importance of the dead, but conclude that: "So far, the purpose and meaning of these tablets remain incomprehensible."

When I venture the purely theoretical and tentative suggestion that these masted reed-mats may represent conventionalized "spirit sails", it is not only on account of certain aspects of their shape, materials, and technique of construction, but also in consideration

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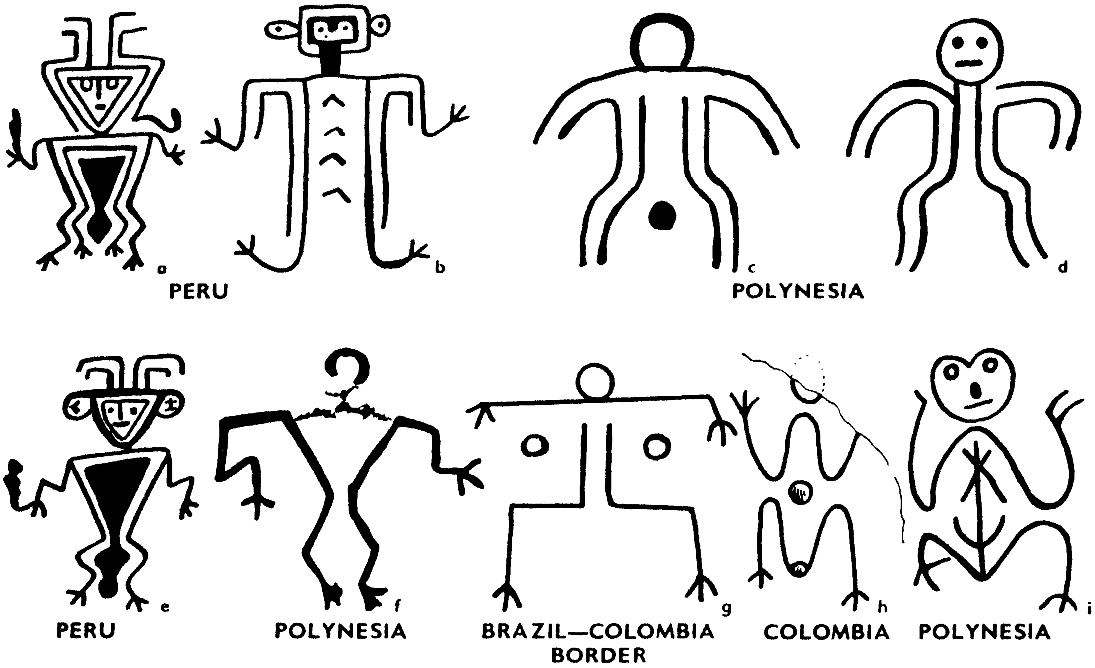
[1] The same author again says (*Ibid.*, p. 208): "In Layer A was found what appears to be a toy balsa made of four corncobs bound together. A smaller model from near the same level is made of one long and two short sections of twigs lashed together, like the model balsas frequently found in the tombs." Since a toy vessel representing a log-raft could be made from sticks of wood, and one representing a reed-raft similarly from a bundle of reeds or grass, one may wonder if the corn-cobs are meant to indicate something else, for instance some sort of inflated pontoon rafts, these having been so important in this area, although generally known only as composed of *two* oblong inflated bags.



of the prevailing motive found on the front of the cloth. The deity reproduced with conventionalized lines in the middle is generally surrounded by all the elementary powers aiding the primitive navigator, namely the celestial bodies and, round the edges, the waves of the ocean, all rendered in familiar ideograms and stylized patterns familiar from Peruvian symbolic and ornamental art. The spirit guide on the sail may well be compared with some other highly stylized and conventionalized symbols reproduced above.[1]

Tupac Inca's pre-Spanish expeditions by balsa raft

Against the background of accumulated evidence from our own history and archæology, we may better understand the possibility of some maritime adventures attributed by the Inca to their own highland ancestors well before America's discovery by Europeans.

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[1] Figs. a, b and e are Peruvian spirit emblems painted or embroidered on the burial gifts formed like sails under discussion. (After Reiss and Stübel 1880—87, Pl. 32—33 a.) Figs. c and d are petroglyphs of a type common in the Marquesas and Society Islands (examples by author from Ornoa, Fatuhiva). This peculiar type of Polynesian petroglyph represents, like so many of the Peruvian spirit emblems, an anthropomorphic figure drawn in two parallel lines in such a way that the body is not joined at the hips. Fig. f is a petroglyph from Kauai, Hawaii, reproduced by Bennett (1931, Pl. XV fig. E, after phot. Stokes), who describes it as "triangular body not joined at the hips." He further says (*Ibid.*, p. 93) of the local anthropomorphic figures in Kauai petroglyphs: "Two, three, and four toes are found, with three as typical." Both the triangular body, gaping hips, crooked arms, and strange number of toes and fingers agree remarkably with spirit emblems in early Peru. Fig. g is a petroglyph from the Brazil-Colombian border, and fig. h is one from Rio Cuduiary in Colombia (Koch-Grünberg 1907, Pl. 25 b; also Vierkandt 1909, p. 113), introduced merely by way of its strong resemblance to the Moriori figure, fig. i, which was carved on a trunk of a Chatham Island *kopi* tree. (Skinner and Baucke 1928, p. 345.)

In Inca history, as in our own, only fragmentary highlights of the past are preserved, and these are naturally focused about the activities of monarchs and outstanding persons whose doings generally affect the welfare of the nation. Voyages of ordinary Indian merchants and fishermen, even if lasting for months, might neither be unusual nor of outstanding importance, and when we hear about them at all it is because early foreign visitors like Ruiz, Pizarro, or Spilbergen found them more remarkable than did the native Inca legend-carriers, to whom the local sailing raft was a familiar sight. When we do hear traditions of balsa raft adventures in the ocean off Peru before the coming of the Spaniards, it is merely through the fortunate circumstance that one of the Cuzco Incas himself descended to the coast and made use of them in coastal battles as well as in long expeditions into the open Pacific. This Inca was Tupac Yupanqui, also known as Tupac Inca, or Topa Inca. (Rowe 1946, pp. 202, 203.) He was the grandfather of the two Inca brothers whom Pizarro and his followers met, and his memory was still fresh among the Indians at that time.

As in Polynesia, so also in Peru, many attempts have been made by modern scholars to transfer the Peruvian datings, based on genealogies, to a fixed European time schedule. This transposition, of course, is equally difficult and approximate in both areas. As Rowe (1944, p. 57) points out, the only two early chroniclers who attempted to work out exact dates for the Inca rulers came to highly different results. Sarmiento claimed that Manco Capac, the first of the eleven prehistoric Incas, lived between 565 A. D. and 665 A. D., and Balboa dated him from 945 A. D. to 1006 A. D. There is also a great difference of opinion as to the dating of Tupac Inca, although he was only the grandfather of the historic Incas. If we keep within the margins of the earliest date suggested for his birth, i. e. 1388 A. D. (Sarmiento 1572) and the latest date suggested for his death, i. e. 1493 A. D. (Balboa 1586) we should at least be fairly safe in judging his approximate period.[1]

Tupac Inca Yupanqui was one of the most mobile of the great Incas. His travels extended by land and sea far outside the borders of the present republic of Peru, to the north, south, east, and west, and is a good example of human enterprise and the possibility of travel in aboriginal South America. Rowe (1946, p. 207 and Map 4) shows with the early chroniclers how Tupac Inca, from his headquarters in Cuzco, "marched up the Highlands as far as Quito" in Ecuador, then "pushed his way down to the Ecuadorian Coast in the neighborhood of Manta". Next we hear "a very interesting story about a voyage of exploration which Topa Inca undertook in the Pacific." He also marched through both the Chimu territory on the North Peruvian coast and the Nazca territory on the South Peruvian coast, and yet visited his Andean capital in the meantime. He was next engaged in his first jungle expedition in the eastern forest lands of Madre de Dios, but returned to suppress a revolt in the Titicaca basin. He subsequently "conquered the whole of Highland Bolivia, and invaded Chile through Lipes and Atacama. In Chile, he penetrated as far as the Maule River at the modern town of Constitución, where he set up the boundary markers of his Empire." This is more than a thousand miles south of the present Peruvian border. "Tucumán and most of the Highlands of Northwest Argentina also submitted to Topa Inca. ... Topa Inca made one more expedition to the eastern forests, and then devoted the rest of his reign to organization." (*Ibid.*, p. 208.)

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[1] Latcham (1928, p. 234) holds that according to the most dependable modern chronologies Tupac Inca must have ruled between 1448 and 1482 A. D. Means (1920 c; 1931) finds opinions so divided that he figures out an artificial average from all modern lists. Rowe (1944, p. 57; 1946, p. 203) considers Balboa's dating of Tupac's rule from 1471 to 1493 the most plausible. (See also Mostny 1947.)

On his travels to the north and south beyond the borders of present Peru, Tupac Inca and his men went on foot; but on his travels out of his country to the east and west they travelled on large log-rafts. The organization of these prehistoric raft expeditions in particular has a bearing on the present study.

Inca Garcilasso (1609, Bk. 7, Ch. XIV) has left us the following account of how Tupac Inca and his army managed to penetrate the wild jungle areas of Brazil in a large-scale expedition down the tributaries of the Amazon:

"*The Events of the Journey to Musu until its Conclusion.*

"It was by this river, although it was so large, and until that time so little known, that the King (Tupac) Inca Yupanqui entered the Province of Musu. For it was impossible to get there by land, owing to the wild mountains, and the many lakes, bogs, and swamps which are found in these parts. Upon this decision he ordered a great quantity of trees to be cut, of a sort found in these regions. I do not know its Indian name, but the Spaniards call it Higuera [Fig-tree], not because it bears figs, which it does not, but because it is as light as the fig-tree, and even lighter. It took them almost two years to cut the trees, dress them, and to make from them very large rafts. They made so many that they held ten thousand warriors, and the supplies which they had with them. Everything provided for, the people and the provisions all in place, the army commander was nominated, as well as quartermasters for the camp and the other army officers, all of whom were Incas of Royal blood. All embarked on the balsas, which were able to carry thirty, forty, or fifty Indians each, more or less. The food was carried on a platform in the middle of each balsa, half a yard high, that it might not get wet. After these preparations, the Incas descended the river, where they had fierce encounters and battles with the natives, called Chunchus, who lived on both banks of the river. They came forth on the water in great numbers, and also along the shores, to prevent a landing and to fight with them down the river. ... Having reduced to the service of the Inca the natives of the shores of this river, who are often called Chunchus after the province of Chunchu, they passed on downwards and subdued many other nations until they reached the province called Musu, a land inhabited by many warlike people, and which was fertile: It was said that it was two hundred leagues [about 800 miles] from the City of Cuzco.[1] ... It was said that in this place the river is six leagues [about 24 miles] wide, and that it takes two days to cross it in their boats."

Sarmiento (1572) also describes some of the pre-Columbian expeditions of Tupac Inca, including his victory over the great Chilean chief Tangalongo which permitted him to conquer the Pacific coast right down to the river Maule. But it was while the Inca was on the northern coast of his empire that he had an adventure which, although it had no political consequences, was of special interest to an experienced navigator like Sarmiento.

We may insert here that whereas Garcilasso strove to show contemporary Spain the high cultural and humanitarian standing of his own royal Inca ancestry, Sarmiento is equally known for his attempts to glorify the actions of the Spanish conquerors, and he is very careful not to give the overthrown Inca dynasty more credit than was absolutely necessary. His *History of the Incas*, as earlier stated, was the result of the seven years (from 1559) in which he devoted himself to the study of native Peruvian history. His information was obtained from the best educated native historians in Peru, who still had personal memories dating from the days before the Europeans arrived, and 42 of them, specified by name and representing all the twelve Inca *ayllus* were assembled at one time to give the rendering of names and events their final approval. (See Markham 1907, pp. 197-201.)

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[1] The Inca measured distances with units called *topo*, equivalent to approximately one and a half Spanish leagues (see Rowe 1946, p. 324), or something slightly less than six English miles.

We learn from Sarmiento (1572, p. 135) that when Tupac Inca travelled on the Pacific coast of North Peru and Ecuador, "He conquered the Huancavelicas although they were very warlike, fighting on land and at sea in *balsas*, from Tumbez to Huañapi, Huamo, Manta, Turuca and Quisin.

"Marching and conquering on the coast of Manta, and the island of Puna, and Tumbez, there arrived at Tumbez some merchants who had come by sea from the west, navigating in *balsas* with sails. They gave information of the land whence they came, which consisted of some islands called Avachumbi and Ninachumbi, where there were many people and much gold. Tupac Inca was a man of lofty and ambitious ideas, and was not satisfied with the regions he had already conquered. So he determined to challenge a happy fortune, and see if it would favour him by sea. Yet he did not lightly believe the navigating merchants, for such men, being great talkers, ought not to be credited too readily." Tupac Inca now called a man named Antarqui, who accompanied him in his conquests because the Inca considered him a great necromancer. Tupac Inca asked him "whether what the merchant mariners said was true", and through much hocus-pocus and his arts of clairvoyance Antarqui said he saw the islands and "gave certain information of all to Tupac Inca."

"The Inca, having this certainty, determined to go there. He caused an immense number of *balsas* to be constructed, in which he embarked more than 20 000 chosen men; taking with him as captains Huaman Achachi, Cunti Yupanqui, Quihual Tupac (all Hanancuzcos), Yancan Mayta, Quisu Mayta, Cachimapaca Macus Yupanqui, Llimpita Usca Mayta (Hurin-cuzcos); his brother Tilca Yupanqui being general of the whole fleet. Apu Yupanqui was left in command of the army which remained on land.

"Tupac Inca navigated and sailed on until he discovered the islands of Avachumbi and Ninachumbi, and returned, bringing back with him black people, gold, a chair of brass, and a skin and jaw-bone of a horse. These trophies were preserved in the fortress of Cuzco until the Spaniards came. An Inca now living had charge of this skin and jaw-bone of a horse. He gave this account, and the rest who were present corroborated it. His name is Urco Huaranca. I am particular about this because to those who know anything of the Indies it will appear a strange thing and difficult to believe. The duration of this expedition undertaken by Tupac Inca was nine months, others say a year, and, as he was so long absent, everyone believed he was dead. ... After Tupac Inca disembarked from the discovery of the islands, he proceeded to Tumipampa, to visit his wife and son [Huayna Capac] and to hurry preparations for the return to Cuzco to see his father, who was reported to be ill. On the way back he sent troops along the coast to Truxillo, then called Chimu, where they found immense wealth of gold and silver worked into wands, and into beams of the house of Chimu Ccapac, with all which they joined the main army at Caxamarca. Thence Tupac Inca took the route to Cuzco, where he arrived after an absence of six years since he set out on his campaign. Tupac Inca Yupanqui entered Cuzco with the greatest, the richest, and the most solemn triumph with which any Inca had ever reached the House of the Sun, bringing with him people of many different races, strange animals, and immeasurable quantities of riches."

When Sarmiento learnt of this maritime expedition of the Inca, no inhabitable Pacific island in the open sea west of South America was yet known to the Spaniards in Peru, nor to any geographer in contemporary Europe.

Another early chronicler who was equally puzzled by the Inca reference to these alleged islands to the west was Father Miguel Cabello de Balboa, who came to Peru in 1566 and was active among the local aborigines for thirty-six years. Balboa refers to the ocean voyage of "King Topa Inga" in two of his works. The first, *Miscelanea antartica*, was never published, and the manuscript is now lost. But a copy was made more than two centuries ago, which is still preserved in the New York Public Library. Here we read of the Inca's march towards the coastal forest-area in the north (Balboa 1576-1586, p. 501):

"... and having discussed his ideas and plans with his officers, he set out with his squadrons—now almost innumerable—and took lodgings in Manta, and in Charapoco, and in Piquara, because it would have been impossible in less space to lodge and sustain such a multitude of people as he had brought with him. It was in this place the King Topa Inga saw the ocean for the first time, upon which discovery he caused it to be profoundly worshipped, naming it Mamacocha, which means mother of the lakes. He got ready a large number of the barges used by the natives, which were of hundreds of logs of notably light timber, fastened together one by one abreast, placing on top of the same a hundred floorings of reed-canes plated together, making very secure and convenient vessels of the sort we have called Balsas. Then, having got together the abundance of these which would be needed for the number of troops who were to accompany him, and having chosen the most experienced pilots that could be found among the natives of these coasts, he went out on the ocean with the same courage and spirit that had governed his success since he was born. Of this voyage I say no more than can be readily believed, but those who have related the exploits of this valient Inga, assure that on this voyage he remained at sea for the duration and extent of one year, some say more, and that he discovered certain islands which were named Hagua Chumbi and Nina Chumbi, and that these islands were situated in the South Seas, on the coast of which the Inga embarked. I do not venture to state definitively what lands these were that may be presumed to have been discovered during this navigation."

In his *History of Peru*, Balboa (1586, Ch. vii, p. 81) again dwells with the travels of "Topa-Inga Yupangui" in a chapter including "His voyage by Sea." We are given very much the same information as cited above. We learn of his great admiration for the Pacific Ocean which he saw for the first time on his descent to the northern lowlands, and how he had "a great quantity of craft assembled of the kind the natives of these coasts use. They are a sort of raft, made of logs of a very light wood strongly attached and covered with reed-cane." The Inca "embarked himself at the head of his best troops," and after a voyage of more than a year they came back and reported the discovery of two islands in the South Sea. Balboa ends: "I dare not confirm this deed, however, nor determine which are the islands in question, but the Indians report that the Inca brought back from this expedition a great number of prisoners whose skin was black, much gold and silver, a throne of copper and skins of animals similar to horses. One is quite ignorant of where in Peru or the ocean washing its coasts he could have found such things."

In this same early narrative, Balboa gives four pages of speculations in which he tries to compare the Inca reference to these islands with the known geography of his days. He was evidently much intrigued by the question whether or not there actually were such islands west of Peru as those "visited by Topa-Inga-Yupangui and his great fleet." Referring probably to the uninhabited Galapagos, and to some other actual or fabulous islands reported by his contemporaries in the near ocean off the Andean coast, Balboa says: "I have mentioned all these facts so that the reader may feel whether it is possible that Topa-Inga-Yupangui discovered any of these islands, the knowledge of which has been lost later through the negligence of his successors." And: "What remains certain is that he returned victoriously from his maritime expedition."

Galapago versus Mangarevs

There has been much speculation, but no agreement has been reached, as to the itinerary of Tupac Inca's Peruvian armada. Since the whole expedition presumably returned to Peru it can hardly have contributed to the pre-European settling of any Pacific islands. In fact, Tupac Inca sailed the East Pacific at a rather recent period when the final Pacific immigrants, the Maori-Polynesians, had already established a lasting hegemony on all their islands. Thus, from a Polynesian point of view, the only importance of Tupac Inca's voyage lies in the fact that it shows how Polynesia—in pre-Columbian time—had neighbours to windward who possessed capacious sailing craft and explored the ocean in them in large travelling parties.

It may still be of general interest to speculate as to where the Peruvian fleet can possibly have navigated for nine months or a year. The Lobos and guano islands can be immediately ruled out. They were considered by the Peruvians to be in home waters, and were regularly visited and exploited by them. Naturally then the Galapagos group suggests itself, as representing the first islands off the Andean coast that could have been visited by Tupac's merchant informants, and later by himself and his whole armada. This possibility satisfied Markham (1907), but was not found entirely satisfactory by Lothrop (1932), Means (1942), and Hornell (1946). Lothrop (1932, p. 238) points out that Tupac Inca would have found no inhabitants on the barren Galapagos; he also believes this group would be difficult to discover without charts and navigational instruments, and he holds that the *jangadas* or balsa rafts of the Inca could not have remained at sea long enough to complete the voyage to the Galapagos, since the buoyant balsa wood, in his opinion, would have absorbed water rapidly and lost its buoyancy before the crew could reach these islands. He concludes: "It is therefore improbable that a fleet of *jangadas* accomplished a voyage necessitating weeks at sea, but there is no reason to doubt that Tupac Yupanqui may have transported an army by sea and plundered the mainland to the north of Guayaquil."

Hornell (1946 a, pp. 52, 53), however, says: "Lothrop's view that the expedition could not have reached the group because of the difficulty of finding its way thither without charts and navigational instruments may be discounted; we may be sure that the Inca's captains would distribute the fleet in such manner that the balsas would sail in line abreast, separated from each other by a considerable distance while still keeping in sight of one another; this formation was the one best suited to achieve success when searching for the group of islands lying to the westward concerning which vague rumours were then current in the Peruvian ports. These rumours must have originated from stories of an archipelago of considerable size seen far to the westward by the crew of some balsa blown seawards, far off its coastwise course.

"If the Inca's expedition was inspired by these rumours, it is obvious that the voyage would begin by following a westward course. When and if the Galapagos were reached, their lack of inhabitants must have proved a grievous disappointment—no loot of any intrinsic value was to be obtained. Under these circumstances the commander would seek counsel with his sea-captains. Those of them who had coasted northward to Panama would tell of the wealth of gold ornaments possessed by the chiefs of that country, and this would suggest that a raid on some of the important towns would yield booty rich enough to compensate for the failure to find the Galapagos worth attention. If this proposal were adopted, a northerly course would take the fleet to the mainland of Panama. Gold was very plentiful in that land at the period in question, and golden ornaments would certainly have formed part of any booty brought back when raiding parties went ashore. If some of the people captured were of darker skin than was then usual among Peruvians, this would be sufficient to give rise to the story that dark-skinned prisoners formed part of the plunder obtained. Having visited the Galapagos and much of the coastline of Panama and Colombia, I am satisfied that this suggested sequence of events furnishes the most feasible and probable explanation of the course taken by the Inca's fleet on this memorable expedition. . . .

"Lothrop, besides denying the ability of the Inca's expedition to reach the Galapagos, is also unable to believe that the voyage was continued to Polynesia. A fatal objection to any such prolonged voyage, he says, . . . is the inherent inability of a log balsa to keep the sea 'long enough to complete such a voyage' owing to the absorbent quality of balsa wood, which soon loses its buoyancy unless frequently taken ashore and dried.

"Certainly no ordinary, untreated balsa raft could make a prolonged oversea voyage unless the Inca's seamen knew of an effective method of treating its absorbent logs with some kind of waterproofing composition as already suggested. This is likely to have been a preparation of gum, resin or wax in some solvent, rubbed over the exterior of the logs in the same way as the Cayapa Indians of the interior of Ecuador coat the exterior of their dug-out canoes with beeswax to protect them from the danger of losing buoyancy. If, as we have been told, the Ecuadorian sailing balsas once plied south to Paita in Peru, and northward to Colombian ports, it seems reasonable to conclude that some waterproofing application was employed to enable these fairly lengthy voyages to be performed and the return trip to be made without the necessity and labour of beaching and dismantling the whole structure for the purpose of drying out the component logs. The South American Indian of Incan times was certainly not less ingenious than the ancient Irish, who carried a supply of butter with them on long coracle voyages for the purpose of smearing it over the hide covering of their frail craft to prevent decay and of daubing it over the seams to keep them water-tight." And (*Ibid.*, p. 52): "As no timber is available in Peru and Ecuador so light and buoyant as that of the balsa tree, we may safely infer that care would be taken to protect the logs from this known danger of absorbing water; . . ."

In spite of the above Hornell (*Ibid.*, p. 52) says: "As for the possibility that any Polynesian islands were found, this is immediately disproved by the mention of gold and *latón*; neither is found either in the Galapagos or in Polynesia. But both gold and copper are met with in Panama, and all the people of Central America were familiar with both metals."

Means (1942, p. 17) says of the same pre-Spanish voyage: "The whole problem of where the expedition went should be studied carefully to determine, if possible, whither the Inca's fleet of *balsas* went. Unless we discard the whole story altogether as merely fabulous, an impossibility in view of the two Chronicles which relate it, the fleet must have gone somewhere. Was it only to some off-shore islands such as Gorgona or La Plata? If so, how could it have taken nine months or a year to accomplish, and how can the 'black' prisoners, and the horse-like animals, be explained? Was it, as Sir Clements Markham and others have thought, the Galápagos Islands that the expedition visited? If so, how explain the 'black' men and the horse-like creatures and the brass seat, all being elements wholly alien to those islands? . . . Or, finally, did the expedition penetrate the Pacific as far west as some Polynesian group, the Marquesas or others? This seems impossible. Had the Inca got into Polynesia, where the natives have admirable boats, he would have learned how to build better craft than *balsas*; but, according to the story, he returned on the same boats that he went out on."

Means leaves the question open, but says (*Ibid.*): "In the present connection the chief point about this story is that it indicates that a voyage with a large fleet of *balsa* rafts was made in a westerly direction by the Inca Tupac Yupanqui from the Gulf of Guayaquil region about 1480 [?]. Presumably, the *balsas* composing the fleet were of the very best type known to the Incas, that is, craft not unlike those in Figure 5 and Plate 20." (I. e. Plate XXXIII **2** and Plate LXVI above.)

Analysing these opinions we may agree that a visit by the armada to the Galapagos islands alone is feasible, but does not satisfy the main details memorized by the Inca historians. If the Inca on the other hand had gone further and visited some of the easterly islands of Polynesia, then, and only then, the essential statement that the westerly oceanic islands were richly inhabited, would be explained. The dark elements found by Roggeween among the mixed population at Easter Island, and by Beechey on Mangareva, would perfectly well satisfy the remarkable claim that "black" men were among the spoils of the Inca armada. But in Polynesia there were no treasures of gold or silver, nor any seats of brass or copper. Lothrop and Hornell have rightly pointed out that these metal spoils could only have been looted by the Inca armada if it had visited some of the 15th century culture-people further north on their own mainland coast. But a northbound coastal voyage alone would leave unexplained the essence of the story, the reference to the populated islands in the open ocean to the far west.

On the whole the idea embodied behind Hornell's interpretation seems the most reasonable. It is understandable that men steering west on an outbound voyage should reach the coast at another place when struggling back in search of their original base. The Inca, after steering west with his Peruvian flotilla only to find in the end some Pacific islands lacking treasures and wealth compatible with Inca standards and requirements, may, on his return, intentionally or by an accident due to the northbound current, have made his landfall higher up in tropic America than where he had first embarked. Here he found a booty worthy of his enterprise. Lothrop's argument that the balsa rafts would sink before reaching Galapagos was based on wrong information; likewise Hornell's claim that the balsa logs would sink unless waterproofed. Hornell's argument that the Polynesian islands could not have been found because the expedition brought back treasures like gold and *latón* is not consistent when he argues that the Galapagos Islands could have been found instead. If the said treasures, as he points out himself, could have been picked up on the return to the mainland further north, then the absence of gold and *latón* in Polynesia does not rule out these islands any more than it rules out uninhabited Galapagos.[1]

The Inca historians spoke of two inhabited Pacific islands, *Ava-* (or *Hagua-*) chumbi and *Nina*-chumbi. The Galapagos would be spoken of either as a dozen islands or as one coherent group, never as two inhabited islands. The easternmost inhabited island in this ocean is lonely Easter Island (Great *Rapa*), and the next is the Gambier Group (*Mangareva*), with its neighbouring atoll Timoe. At the first sight it would seem directly *impossible* that Easter Island could be touched on a voyage from Tumbez, but on second thoughts we may be safer if we say improbable. For, as pointed out by Hornell, the large balsa raft fleet went to sea expressly to search for islands with given positions, and the rafts would certainly not have trailed foolishly one in the wake of the other. Inca history claims that 20 000 men participated, which would imply that 400 or more well-manned balsa rafts took part in the search. If this is to be taken literally, or at least to indicate that a large army set out, the exploring party could have spread out over a front of vast proportions. There are apparently no memories on Easter Island which indicate that Tupac Inca's fleet called there. But we cannot so easily pass over the next inhabited island to the west, Mangareva.

Christian, who travelled for years in the Pacific island world and published a number of works (1899; 1910; 1924 a; 1924 b) including a vocabulary of the Mangaia dialect, wrote from Eastern Polynesia (1924 a, p. 525): "And the Mangarevans have a tradition of a chief called Tupa, a red man, who came from the east with a fleet of canoes of non-Polynesian model, more like rafts—surely a memory of some Peruvian *balsas*, or raftships."

Christian was probably not familiar with Peruvian traditions, or he would apparently have suspected a connection with Tupac Inca's flotilla. But Rivet, one of the few anthropologists who has made a comparative study of Peru and Oceania, twice quoted Christian on the Tupa tradition (1928, pp. 583, 603; 1943, p. 124) and suggested that Mangareva was the inhabited island (or one of the inhabited islands) which Tupac Inca had visited from Peru. The same author (1943, pp. 122, 125) gives a brief description of the balsa raft with its square cotton sail and steering-oar aft, and he compares its capacity of 30 tons with that of Pizarro's two caravels, which were respectively 40 and 60 tons.

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[1] Hornell (*Ibid.*, p. 53) believes that the skin and jawbone, like those of a horse, could have been taken off a sea-lion, and this guess is as good as any. We can hardly believe that the Inca found in Panama a deer or some other animal with a short- and stiff-haired hide, which was unfamiliar to them in South America. The only surprise the Polynesian fauna could offer the Peruvians would be the domestic island swine which, unlike the European pig, in some cases may have a hide roughly similar to that of a horse, and a jawbone of considerable size.

For a few more details regarding Tupa, who visited Mangareva, we may turn to the Tiripone manuscript, as quoted by Buck (1938 b, p. 22). This manuscript, written in the last century by Mama Taira Putairi, son of a Mangarevan chief, states:[1] "An important visitor to Mangareva was Tupa. The native history states that he came in the period of the brother kings Tavere and Taroi." There had been twelve generations of kings on Mangareva before Tavere and Taroi, and Buck, judging the date of these brother kings from their place in the island genealogy, estimated that they must have lived at the beginning of the 14th century. This is somewhat earlier than Tupac Inca's 15th century voyage from Peru, but none of these dates are fixed; both are based on flexible generations. The Mangarevan stories of Tupa are full of superstition, including the description of a wonderful raft which he caused to cut a lasting channel into their island. But there is a more definite memory as to the direction whence he came (*Ibid.*):

"Tupa sailed to Mangareva through the southeast passage subsequently named Te-Ava-nui-o-Tupa (great-channel-of-Tupa). He went ashore on the islet of Kava-maru and built a *marae* to his god Tu." Buck (*Ibid.*, p. 453) also refers to another native text according to which certain Mangarevan stone *maraes* "were said to have been built originally by the voyager Tupa; . . . He sailed right down to Mangareva and lay afloat in the Great-pass-of-Tupa. He went ashore at the islet of Te Kava. There he made a *marae* to the god Tu, which was named Te Kava-maru."[2]

The map on next page shows the location of Tupa's passage, and thus the eastern direction whence he arrived. The fact that King Tupa's visiting fleet lay afloat in Te-*Ava*-nui-o-Tupa (The-great-*Channel*-of-Tupa) while he went ashore at Te *Kava* island is remarkable, since Tupac of Peru came back from the ocean to speak of his visit to an island with almost the same name: *Ava*-chumbi. Both Valcarcel and Danielsson (*viva voce*) have suggested the possibility that the Quechua suffix *chumbi*, or *chumpi*, to the name of Tupac Inca's two Pacific islands may indicate an atoll or ring-shaped coral reef, as the word means "girdle". (Grigorieff 1935, p. 320.)

Emory (1939) in his *Archaeology of Mangareva and Neighboring Atolls* shows that the people of Timoe, the tiny inhabited atoll immediately east of Mangareva, have a tradition of the same voyager. They say allegorically that their own atoll "was a head-dress of ripe pandanus belonging to Tupa when he sailed the seas." The same author shows with Laval that the Mangarevans also state that Tupa first landed in Timoe when he came by sea, but went on to Mangareva because he found no food on Timoe.

The memory of this great roving visitor is apparently not found in any other Polynesian islands but Timoe and Mangareva, both neighbours, both more 'girdle'-shaped than any island nearer Peru, and both representing the eastern extremity of all inhabited Polynesian land with the exception of Easter Island. The fact that King Tupa did not visit Timoe and Mangareva from any other *Polynesian* group is indicated by the direction whence he came, by his absence from any of the other island traditions, and by the fact that he told the Mangareva island people before he returned that his home was "a vast land"; the Mangarevans

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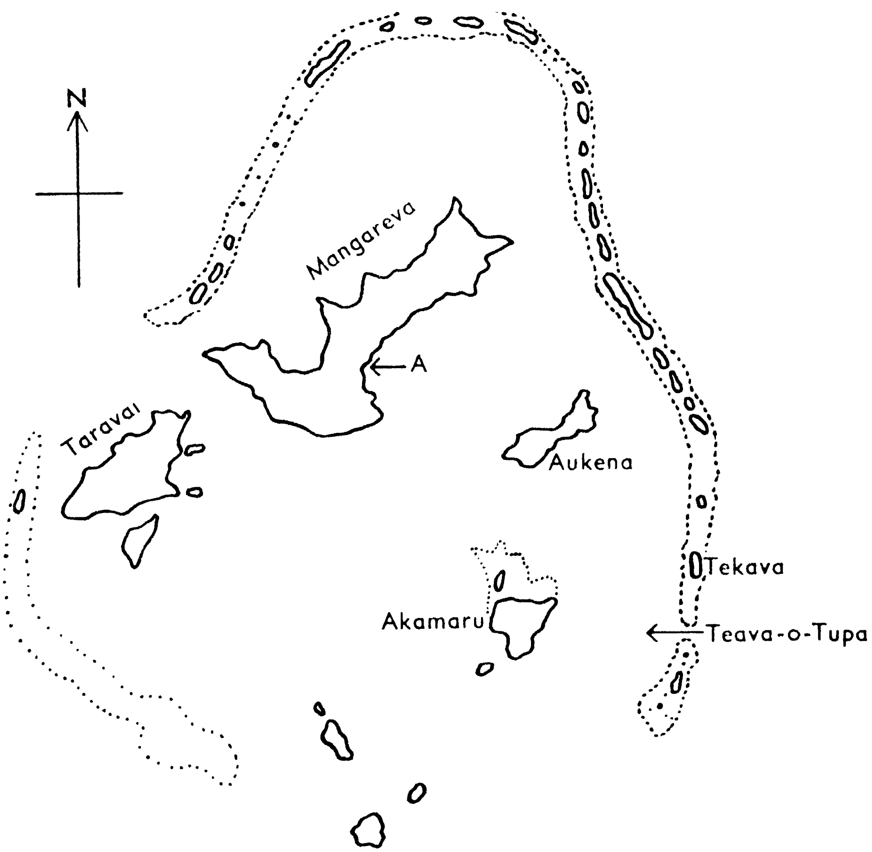
[1] Mama Taira Putairi collaborated with Father Honoré Laval, a missionary who lived in Mangareva from 1834 to 1871.

[2] It is interesting to note with Tschudi (1891, p. 180 ft. n.) that attempts have been made to identify the Peruvian deity Kon with the Polynesian deity Ku *alias* Tu.



The Gambier Islands. (After Laval 1938.) The foreign king Tupa arrived from the east through Teava-o-Tupa.

spoke of it both as Hawaiki and Takere-no-te-henua, and they said that according to Tupa this vast land "contained a large population ruled by powerful kings." (Buck 1938 b, p. 23.)

There is only one truly important Tupac (or Topa) in Peruvian history, and similarly only one Tupa in Polynesia. Without other evidence the similarity of their names would not have suggested any connection. But none of them are remembered as stationary. The Peruvian Tupac is memorized as a specific king who sailed west into the Pacific and returned to Peru after visiting two distant inhabited islands, and on two of the very nearest inhabited islands in that ocean Tupa is memorized as a foreign king who came from the east and stayed only for a short while, afloat in the south-east passage, before he left the islands to return to a vast land with a large population and powerful kings. The probability that both references are to the same Tupa(c) seems large.

Mangareva, like any neighbouring atoll, would have proved most disappointing to the treasure-seeking Tupac Inca; he would have found nothing but neolithic artifacts, fish and fruit and a limited supply of meat for his raftsmen, and the only real curiosity worth showing his people at home would have been a few live individuals of the dark Melanesoid type later seen by the Europeans also among the mixed population on Mangareva. For "black" men were unknown in the part of the world which the much-travelled emperor had visited so far. To compensate for the meagre booty on the island, the returning armada could have made the continental raid as suggested above when discussing the absence of treasures in the Galapagos.

Memories at Ica and Arica of prehistoric voyages to distant Pacific Islands

Father Joseph de Acosta (1590 a, Bk. I, Ch. xix, p. 68), who resided in Peru from 1569 to 1585, before Polynesia was known to Europeans, speculated as to how man and beast had migrated from Paradise to America. He concluded that the New World must join the Old by land either north of the Californian peninsula or else south of the Straits of Magellan, places not yet visited by Europeans. Reflecting on the difficulties of ocean crossings without ships, he mentions the legends from Manta and Puerto Viejo (where the Viracochas assembled and departed), which spoke of giants who had come and departed by sea. Then he says (English translation of 1604): "In like sort, the Indians of Yca and Arica report, that in old time they were wont to saile farre to the Ilands of the West, and made their voiages in Seales skinnes blowne up. So as there wants no witnesses to prove that they sailed in the South sea before Spaniards came thither."[1]

Since Ica and Arica represent two ancient sites on the aboriginal Peruvian coast where modern archæology has yielded the richest finds respectively of prehistoric centre-boards and model wooden rafts, one may wonder whether the traditions referred to could perhaps be memories from days when better craft than coastal seal-skin floats were constructed locally.

Other Peruvian traditions of voyages to distant islands

Both Rivet (1928) and Lehmann (1930) refer to a remarkable report which originated in Peru during the early decades of discovery, and was first published by Jiménes de la Espada (1878). An English translation by Amherst and Thomson was printed by the Hakluyt Society in 1901, based on a very old undated manuscript copied in the Egerton Collection (No. 1816, Fol. 223) of the British Museum. The manuscript deals with an account given to Captain Francisco de Cadres by a very aged Indian of Peru at a time roughly contemporary with the first Mendaña expedition, which missed Polynesia but discovered the Solomon Islands further west. Captain de Cadres' attempt was to gain information from the aged Indian about the distant islands which the aborigines of Peru claimed to exist out in the open Pacific. The text of the report runs as follows (Cadres s. a., p. 465):

"An Indian named Chepo, about 115 or 120 years old, promised to answer truly whatever questions should be put to him concerning the said islands, it being understood that he would be put to death if he lied. This was in the time of Captain Francisco de Cadres, who sought the said Indian and found him and elicited from him the following account. He was asked:

Question. From whence the said Indians crossed to the said islands.

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[1] See Acosta 1590 b, Vol. I, p. 56. The original text runs: "Tambien cuētan, los Indios de Yca, y los de Arica que solian antiguamente manegar a unas Islas al Poniente muy laxos, ..."

Answer. From Puerto de Arica and Puerto de Ylo.

Q. How many days does it take the said Indians to perform this voyage?

A. After two months' journey they reach a desert island called Coatu, in which there are three high mountains and many birds.

Q. On proceeding to the said islands, on which side do they have the said desert island?

A. On the left.

Q. What is the name of the first island after the desert island?

A. It is called Qüen, and is thickly populated; the name of its chief is Qüentique.

Q. Are there any other chiefs?

A. Yes, two called Uquenique and Camanique.

Q. Is there another island?

A. Yes, and it is called Acabana.

Q. How many days does it take to go from Qüen to Acabana?

A. Ten days.

Q. Is there a chief in the said island?

A. Yes; his name is the same as that of the island; he has a son called Casira, who governs and commands the whole island instead of his father, who has delegated to his son power to govern the said island without his intervention."

The treasure-seeking Spaniard then began to ask about the possessions of the islanders, and although old Chepo's knowledge was probably long since exhausted he evidently knew what answers to give to please the greedy Spaniard, for he referred to "gold" whether the question was concerned with the inhabitants' headwear or their dwellings, offerings, etc. Finally the ancient report states: "He was asked whether all that he had said was truth, for, if not, he would be punished. He confirmed all that is stated above, and added that they used rafts of wood." The latter remark is interesting, since it came spontaneously from the old Indian, without any request from the Spaniard. Disregarding those details of the account which were given under pressure of the Spaniard's questions and threats, we have once more some aboriginal Peruvian references to far islands out in the Pacific, some of which were inhabited. As Amherst and Thomson say in their footnote to the translation: "Though Chepo evidently considered that he might as well be hanged for a sheep as for a lamb, most native traditions have some slight substratum of truth, and he may have been relating a garbled version of an actual voyage of the Indians."

Since the aboriginal Peruvian voyagers chose as their starting points the southern ports of Ilo and Arica (below Tiahuanaco), the Galapagos cannot in this case be the islands which they steered for. Easter Island, and beyond it Mangareva, are again the nearest inhabited islands in the ocean. Speaking, as he did, in terms of months rather than days, the old Peruvian informant had his mind set on islands far beyond the Peruvian horizon. After two months' journey into the ocean from Ilo or Arica the first land was to be sighted, and this was only an uninhabited bird island with three high mountains, and the voyager had to continue still further before he would reach the first thickly populated island. Now, a voyage from Ilo or Arica to Easter Island will, after just about two months' sailing with balsa raft speed, pass Sala-y-Gomez, about a week before the arrival to Easter Island. Not only is Sala-y-Gomez just such an uninhabited bird island, but it lies right in the course from Ilo or Arica to Easter Island, and it is the only speck of dry land found anywhere in all the intervening ocean. What is more, from a distance Sala-y-Gomez has the characteristic appearance of three large barren rocks raising out of the ocean.

Also Amherst and Thomson (*Ibid.*), in rendering the old tradition, pointed out that inhabited Easter Island lies more directly opposite Arica and Ilo than do any other inhabited or uninhabited island, to which they add: "and the navigator would certainly have to pass near the barren islet of Sala-y-Gomez, of which Beechey wrote: 'When first seen the island has the appearance of three rocks.' It is, however, far from being mountainous."

There are a few remarkable points in the account obtained from the aged Indian. Firstly that Sala-y-Gomez and Easter Island so strikingly well satisfy the geographical position given, the first being uninhabitable, the second well populated. The statement that an uninhabited bird island with three mountains is found two months' voyage out into the Pacific before the first populated island can be reached does not sound like a native fable. When the present author planned the Kon-Tiki raft voyage from Peru, two careful estimates were made: One was that of a raft voyage just from Ilo below Tiahuanaco, which would have full benefit of the trade wind but would get into a somewhat slower and southerly twisting branch of the ocean current. This voyage, it was estimated, would take a raft to the neighbourhood of Easter Island, which would be reached after roughly 70 days. The other alternative was to start further up the coast and follow the main sweep of the Humboldt Current, which would land us in the Marquesas or Tuamotu Islands after a much longer journey but with a quicker rate of daily progress. There is reason to assume that the estimate for a raft voyage from Ilo to Easter Island was fairly accurate, since the estimate of 97 days for the corresponding voyage from Callao to the fringe of the Tuamotus proved very nearly correct, the first island being sighted after 93 days, the second after 97, and the third after 101. If 70 days are needed from Ilo to Easter, then something over 60 days would take the voyagers to the desert island of Sala-y-Gomez, as claimed by the old Indian in regard to his uninhabited island *Coatu.*[1]

The old Quechua Indian referred to the occupied island beyond the bird island as Cüen, and claimed that its supreme chief was known as Cüen-tique. When the first Spaniards in 1770 visited Easter Island from Peru and made the first sketchy notes on the local language, Agüera (1770, p. 109) recorded that the Easter Island word for "high chief or lord" was *Teque-teque* (*i.e. Tiki-tiki*).

Unbelievable as it may appear to many in our day, we cannot overlook the possibility that *Coatu* and *Cüen*, as referred to in aboriginal Peru may be Quechua names adopted for Sala-y-Gomez and Easter Island, visited by some of the long-range balsa raft exploring parties from South Peru. Old Chepo's knowledge was probably limited to the initial sailing direction to these two nearest islands in the ocean, and the fact that there were other inhabited islands beyond them. Any additional data were probably produced and volunteered under the continued threat and questioning of the Spanish interrogator.

Earlier memories of voyages off the west coast of South America

The available evidence for seafaring activity in aboriginal Peru includes other memories of less historic authority, but of importance because they date back to periods before the establishment of Inca rule and culture.

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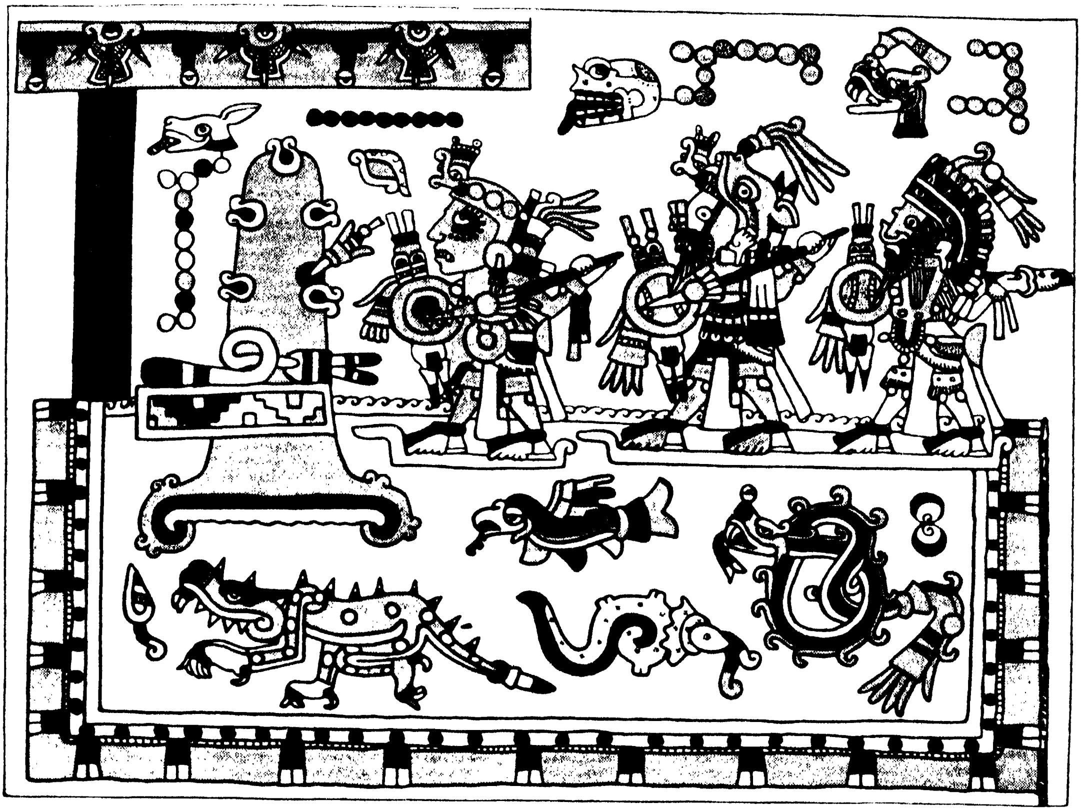
[1] We may note that *Koati* is used as name for one of the two principal islands in Lake Titicaca.

We recall from Oliva's *History of Peru* (p. 263 above) that a tradition existed on the coast that the forefathers of the Incas had not descended from the sun, but originally sailed down the coast from the north. According to this unusual version the migrants had settled for several generations in the vicinity of Santa Elena, on the Pacific coast of Ecuador west of Guayaquil Bay. Many made voyages along the coast and some were shipwrecked. One branch took up its abode on Guayau island off the coast, where a certain Atau had died, leaving behind his son Manco Capac, who was said to have been born on that Ecuadorian island. Manco Capac later set out, "in such craft as he had, with two hundred of his people, dividing them into three bands. Two of these were never heard of again, but he and his followers landed near Ica, on the Peruvian coast, and thence struggled up the mountains, reaching at last the shores of Lake Titicaca." As we have seen earlier, part of this story was in its essentials told also to Stevenson nearly two centuries later. But the great majority of the chroniclers collected their accounts of Manco Capac's background and appearance from the Cuzco Incas and historians of the highlands, and these favoured the more divine solar origin of their progenitor, bringing him forth mysteriously from a cave in the highlands, with an itinerary which at the earliest began on the shores or the island of Lake Titicaca, where formerly his progenitor Viracocha had also made his sudden appearance among men. How such solar hierarchs had originally arrived at Lake Titicaca is a problem not even touched on in the traditions of the highland natives or chroniclers.

The lowland people of Peru not only possessed traditions of the ancestors of the highland Incas having come southwards from Ecuador in craft along the coast, but they maintain that some of the pre-Inca founders of culture in the Chimu area had the same origin. Father Miguel Cabello de Balboa obtained this information in the Lambayeque area, some 150 miles south of the important Peruvian balsa-raft port of Paita, during the first century of the conquest. A manuscript copy of Balboa's account, *Miscelanea Antartica* (1576-1586), is preserved in the New York Public Library, and the Lambayeque story is frequently reproduced in the literature on the subject, recently by Means (1942, p. 16), Leicht (1944, p. 18) and Gladwin (1947, p. 208). According to Balboa: "The people of Lambayeque say—and all the folk living in the vicinity of this valley agree with them—that in times so very ancient that they do not know how to express them, there came from the northerly part of this Piru, with a great fleet of *Balsas*, a father of Families, a man of much valour and quality named Naymlap; and with him he brought many concubines, but the chief wife is said to have been Ceterni. He brought in his company many people who followed him as their Captain and leader."

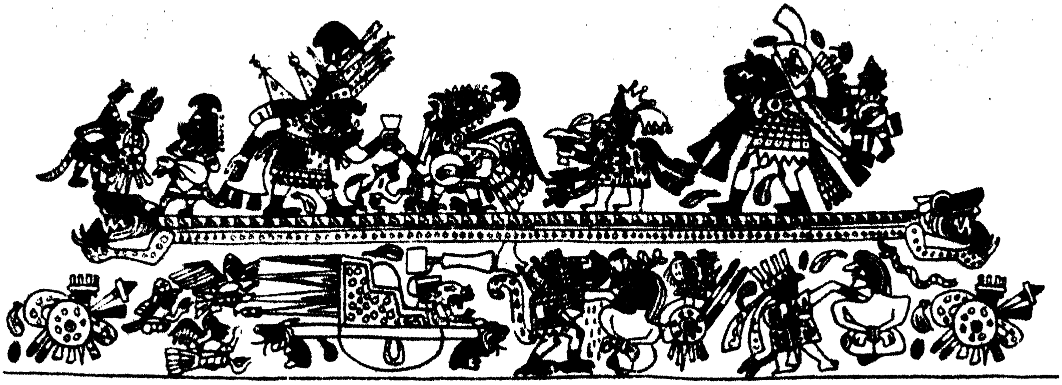
A great many names and details are specified in this most elaborately memorized historical tradition, and Means (1942, p. 16) states: "The terms in which this marine migration is described make it very clear that the migrants were not mere primitive wanderers. They were people of advanced culture and of rather well-developed social organization. It is not possible to fix accurately the time of this elaborate migration along the coast southwards to Lambayeque on a fleet of *balsa*-log rafts; but, to judge by what Father Cabello de Balboa tells us of after events, it must have taken place long before the Incas conquered that part of the shore-country early in the fifteenth century." Joyce (1912, p. 50) similarly remarks: "The company seems to have been a complete tribe or clan rather than a marauding party, since it included many women, ..."



Page from the Aztec *Codex Nuttall* depicting bearded men attacking a town in a lake by means of rafts. The symbols above the raftsmen represent the name and number of their birthdays. (Compare the Inca legends of the bearded *Viracochas* who migrated by sea as if walking among the waves, page 238 above.)

The same author (*Ibid.*, p. 52), as well as Enock (1914, p. 15) and Karsten (1938, p. 59) show that the Andean culture-people who founded Quito in the highlands of Ecuador also claimed partial descent from Pacific raft voyagers. Some of their ancestors, known as the Cara people after their leader of that name, had reached the coast of Ecuador north of Manta by sea-going rafts, and after some stay on the tropic coast they had ascended the river Esmeraldas until they arrived at the territory of Quito, then ruled by a chief of that name. The immigrants from the coast seized a number of villages and succeeded in establishing themselves in the country, where, through amalgamation with the former inhabitants, they had formed a single nation by the time the Inca armies arrived from the south.

The iconographic art of the Early Chimu shows that seafaring dates back to their earliest mythology, and their deities voyaging on a raft of symbolic serpents (fig. p. 572) recall the already cited Mexican myths of Quetzalcoatl, who came to that country in a winged ship and left on a raft of serpents. Friederici (1907, p. 74), in his monograph on aboriginal American navigation, points out that sail was already in use in Peru when the Spaniards arrived, and adds: "The Peruvians later related that they had learnt the art of sailing from Viracocha, who had come to them by sea on a sail-carrying raft." Instead of suspecting



Early Chimu symbolic art. (From Kutscher 1950.) Upper half represents culture heroes voyaging on serpent raft.

that Viracocha might have come down the coast from the north on his sailing balsa—like the Naymlap's maritime party, or Manco Capac's, possibly also Cara's, and certainly Pizarro's—Friederici dwells for a moment on the possibility that Viracocha's raft had come across the Pacific from Easter Island, but in the end he rejects this idea because he finds the evidence too legendary.

Sarmiento's search for the islands described by the aborigines of Peru

In Amherst and Thomson's "Introduction and Notes to: The Discovery of the Solomon Islands by Alvaro de Mendaña" (1901, p. iv), we find an interesting description of how this pioneering expedition came about.

During the first decades after Hernando Magellan in 1521 accomplished the first European crossing of the Pacific from east to west, only the Spaniards in Mexico sent expeditions into the open Pacific, all of which pushed down-wind north of the equator and ended up in Micronesia and the Philippines. As Amherst and Thomson (*Ibid.*) express it: "Peru, being in the throes of civil war that ensued upon Pizarro's assassination in 1541, had work enough without embarking on foreign discovery. But the great unknown ocean lay stretched before the Peruvian colonists every day, to fire their imagination." With the dawn of settled government, Peru became no place for the Spanish adventurers. They became more and more interested in the tales of inhabited islands in the ocean, as current among the aboriginal Peruvian mariners. The rumours of the merchants' discoveries which were followed by Tupac Yupanqui's visit to some Pacific islands became a fable in the taverns as well as a debated question in the palace.[1] Pedro Sarmiento de Gamboa, who had devoted years to the study of aboriginal Peruvian history and traditions and, in the opinion of the viceroy, was the most able connoisseur on this subject, professed to be able to fix the bearings of the islands from what he had learnt from the natives. He and other learned members of the Spanish colony came to the conclusion that the islands would be found at about 15° S and about 600 leagues (about 2 400 miles) into the ocean west of Peru. (*Ibid.*) In 1567 Sarmiento obtained the consent of the government to set out to search for the said islands, on the condition that the Governor's nephew Alvaro de Mendaña acted as commander of the expedition. Mendaña's orders were to steer for the islands referred to by the Incas, and to form a settlement there. The expedition left Callao on November 19, 1567, and steered west-south-west—according to the given information—for 26 days. It may here be observed that Easter Island is precisely west-south-west of the port of Callao, and that the Spaniards who later reached Easter Island in 1770 gave the distance as "about 600 leagues distant from Callao, and about the same from the mainland of Chile." (Gonzales 1770-71, p. xliv.)

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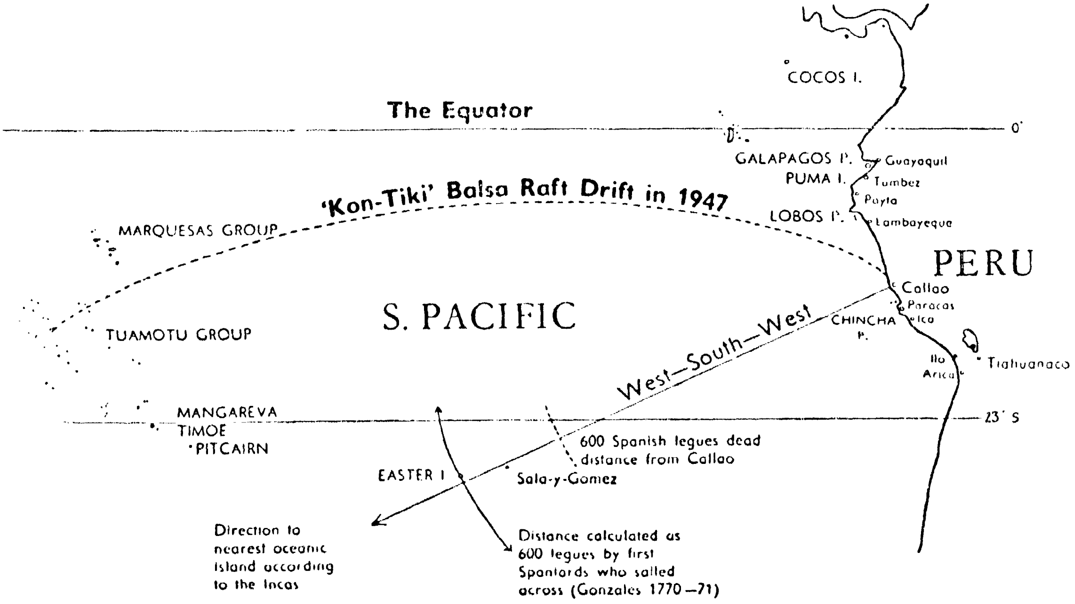
[1] In 1537 such rumours must apparently also have reached Cortez in Mexico, since he despatched two vessels under the command of Fernando Grijalva and Alvardo to explore the Equatorial ocean between South America and the Moluccas for "islands to the westward which were imagined to abound in gold." (*Ibid.*) This expedition claimed to have seen some islands about 2° N, but experienced mutiny, was shipwrecked near New Guinea, and ended up in the Moluccas.

Jealousy was bound to arise between the experienced navigator Sarmiento, who had originated the expedition to search for the Inca islands, and the younger man in supreme command. Already on November 30, after only eleven days at sea, Sarmiento saw a cloud formation which he wanted to inspect, as he thought it might indicate an island. But Mendaña did not want to change the course, and passed on, to the fury of Sarmiento. Failing to find land after 26 days, Mendaña gave up and altered the course to west-north-west, apparently passing through the wide open passage between the Tuamotus and the Marquesas about December 21. As is well known, this first Mendaña expedition ended with the discovery of the Solomon Islands in Melanesia.

The failure to find the islands sought for west-south-west of Callao was a blow to Sarmiento's prestige and he tried to put the whole blame on Mendaña by suggesting that the clouds he was not permitted to inspect, some eleven days or 200 leagues out at sea, might have indicated the presence of the islands they searched for. In his famous *History*



of the Incas, in which Sarmiento included Tupac Yupanqui's island discoveries, he added concerning the latter (1572, p. 136): "These are the islands which I discovered in the South Sea on the 30th of November, 1567, 200 and more leagues to the westward, being the great discovery of which I gave notice to the Licentiate Governor Castro. But Alvaro de Mendaña, General of the Fleet, did not wish to occupy them."

A very interesting paper found in the city of La Plata concerning this first Mendaña expedition, and which speaks so much in favour of Sarmiento that he is suspected by Amherst and Thomson to be the author of it, contains the following important data (Gamboa, s. a.): "It was intended that they should follow the course west-south-west up to 23 degrees, which was the latitude that Pedro Sarmiento had fixed upon; ..." This itinerary to the nearest inhabited island, based solely on native Peruvian reports concerning an ocean yet unexplored by Europeans, takes us to a spot so suspiciously close to Easter Island and Sala y Gomez, that one is led to believe that some Peruvian merchant explorers may possibly have been far enough out to sea to know roughly where to find the nearest island. It is certainly rash to argue that the Inca belief in a distant island located in the empty ocean roughly where Easter Island actually is found, was merely the chance outcome of Inca speculations. There were men of action in Peru long before the coming of Pizarro and European culture.

Canoes versus rafts

We have in earlier parts of this book propounded the view that the oceanic islands of Polynesia were first discovered and settled by voyagers from aboriginal Peru, the only neighbouring coast inhabited by true high-culture people with an easy and natural access to these islands. We have also shown that the original culture-people of the islands were subsequently overrun by war-like conquerors, who arrived in spacious sea-going canoes in the early part of the present millennium. Available evidence makes it likely that these most recent sea-rovers were a whole tribe of refugees driven by force out of the nuclear area of British Columbia. With their spread from island to island all over Polynesia, a dug-out craft built on principles entirely different from the "wash-through" raft-boats of Peru established itself, together with the new wood-carving culture, on nearly all the islands. The speed and elegance of these streamlined war-canoes would certainly not tempt their owners to abandon their own marine architecture in favour of the capacious but broad, flat-bottomed and slowly moving cargo rafts they might have seen in use among their island predecessors. With the probable origin of the historic Maori-Polynesian craft traced back to the North Pacific archipelago behind Hawaii, we have now only to find within the same island territory some deviating type of craft differing from the Maori-Polynesian-Northwest Indian elevated canoe, and thus possibly representing surviving vestiges of the wash-through craft used by the earliest island immigrants.

Rafts in Polynesia

One of the leading contemporary authorities on aboriginal Pacific water-craft is the late James Hornell, who in the course of life-long research contributed a considerable literature on the subject. (Hornell 1928; 1931; 1936; 1938; 1943; 1945; 1946 a; 1946 b.) He writes

(1931, p. 353): "Everywhere throughout Oceania we come across evidence of the present or past use of rafts. In Mangareva, not far from Pitcairn Island, and virtually the easternmost island of any importance in Polynesia with the exception of Easter Island, sailing rafts are or were until recently in use approximating closely in form to that of the sailing balsa of Ecuador. The traditions of Tonga and Samoa make repeated mention of the use of large sailing rafts in old times; indeed, in Tonga they are even credited with having been the vessels employed for the conveyance of some of the cyclopean masses used in the construction of their megalithic monuments from Wallis Island, 500 miles to the northward."

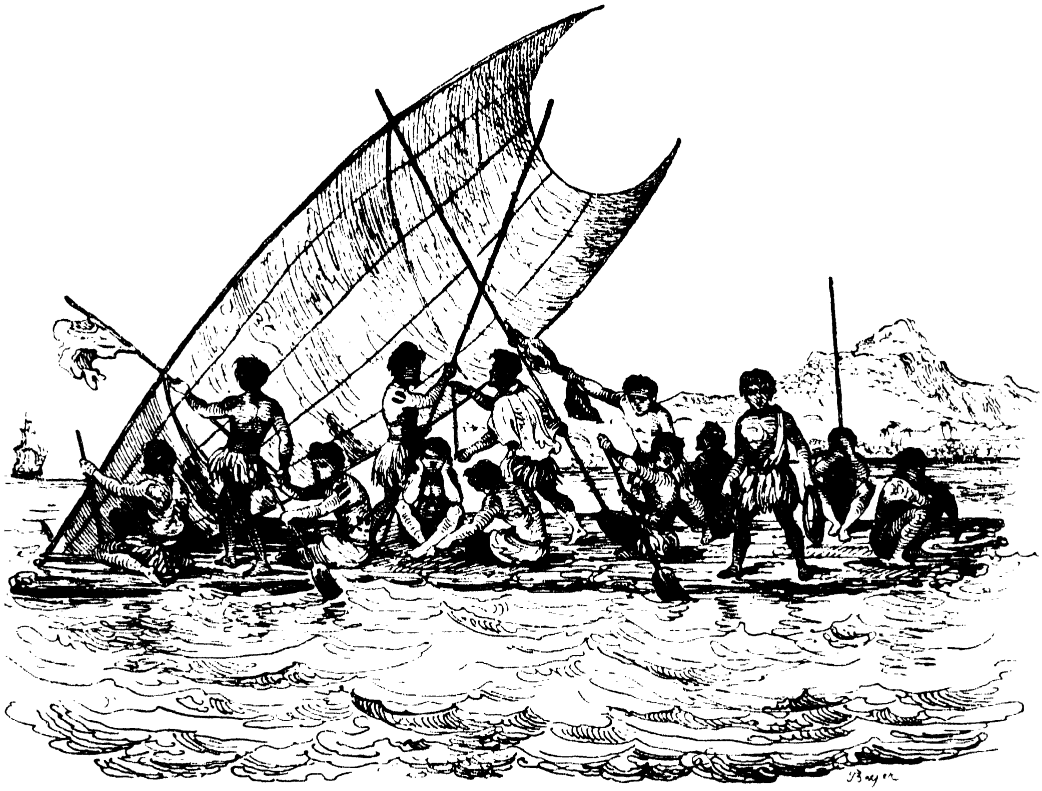
The association of sailing rafts with the megalithic era of Tonga is a hint of some value, and so is the reference to the close approximation in form between the balsa raft of South America and the sailing raft of Mangareva. The earliest report we have on the water-craft of Mangareva or the Gambier group comes from Captain Beechey (1831, p. 105), the first European to visit the local natives. He wrote about his first arrival, when he was about to explore the group: "As we were putting off from the ship in the boats to make this interesting inquiry, several small vessels under sail were observed bearing down to us. When they approached we found they were large katamarans or rafts, carrying from sixteen to twenty men each. At first several of them were fastened together, and constituted a large platform, capable of holding nearly a hundred persons; but before they came near enough to communicate they separated, furled their sails, and took to their paddles, of which there were about twelve to each raft. We were much pleased with the manner of lowering their matting sail, diverging on different courses, and working their paddles, in the use of which they had great power, and were well skilled, plying them together, or, to use a nautical phrase, keeping stroke."

He further (p. 135) wrote:

"The timber of which their rafts are constructed is a red wood, somewhat porous, and of softer grain than the *amai*. Some of these trunks are so large as at first to excite a suspicion of their having been drifted from a more extensive shore; but the quantity which they possess, several logs of which were newly shaped out, affords every reason for believing that it is the produce of their own valleys." Also (p. 143): "Contrary to the general custom, no canoes are seen at Gambier Islands, but rafts or katamarans are used instead. They are from forty to fifty feet in length, and will contain upwards of twenty persons. They consist of the trunks of trees fastened together by rope and cross-beams: upon this a triangular sail is hoisted, supported by two poles from each end; but it is only used when the wind is very favourable; at which time, if two or three katamarans happen to be going the same way, they fasten on and perform their voyage together. At other times they use very large paddles made of dark hard wood, capable of a good polish, and nearly executed."

An illustration of the first Mangareva craft and crew to greet Beechey's ship is reproduced here in Plate LXXIX. An illustration later published by d'Urville (1854) to illustrate his own voyage is so conspicuously like the one in Beechey's work that the latter must be a slightly altered copy of the former, with a crew of thirteen natives instead of twenty. (See fig. next page.)

As Haddon and Hornell (1936, pp. 93, 94) show, the sea-going Mangareva raft is composed of an odd number of logs; the fore ends of the logs are pointed, or rather wedge-shaped, and the logs in the centre project farther than the more lateral ones. They write



further: "Both D'Urville (1834-35, Vol. I, p. 517) and Moerenhout (1837, Vol. I, p. 109) confirm Beechey's description of the Mangarevan custom of joining several rafts together to form a spacious platform. D'Urville says that five or six were usually thus arranged, capable of carrying 80 or 100 men, and that each individual raft was manned by a crew of 12 or 15. Moerenhout mentions that this joining up was customary 'when going before the wind'. He adds that some rafts, presumably individual ones, could carry as many as 40 people."

We may add that Moerenhout (1837, Vol. I, p. 109) claims, like Beechey before him, that there were no canoes on Mangareva, only rafts. Laval (1938, p. 246), however, who later resided on Mangareva from 1834 to 1871, can tell us that the Mangarevans also were familiar with the construction of the regular type of Polynesian canoes (both double and single), which makes their preference for raft navigation the more remarkable. Moerenhout furthermore describes a type of Mangarevan raft made of only three tree trunks lashed together by cross pieces, but, as Buck (1938 b, pp. 282, 283) shows, this applies to small fishing rafts only, since Laval informs us that for transportation "big rafts, 20 feet broad and 60 feet long, were resorted to."

Buck (*Ibid.*, p. 22) also shows that Caillot collected a Mangareva tradition to the effect that the brother kings Tavere and Taroi went from Mangareva to Rarotonga (some 1 200 miles) to help their uncle in a battle, navigating the ocean with two rafts, each containing a thousand men. Buck does not believe that rafts can have had the quality needed for undertaking long sea voyages, even if such a size were possible, but since he apparently accepts the rest of the story we have to face the possibility that Caillot has perhaps been given a somewhat exaggerated reference to an expedition with a flotilla of rafts "joining up", as actually seen by Beechey, d'Urville, and Moerenhout. Also Dixon (1934, p. 168) rejects the Mangareva traditions of enormous rafts sailing the ocean with a thousand men.

The failure of most modern observers to realize that rafts are much safer—although slower—at sea than an open canoe of any size has caused much irrational speculation as to the preference for rafts at Mangareva. Churchill (1912) wrote: "It is impossible to find a wholly satisfactory explanation of the absence of navigation [?] from this minor unit of a race altogether and elsewhere naval in the highest degree. Because Mangareva must have been populated in the beginning by sailors in possession of the two shipping arts—it is impossible to imagine that Mangareva was thus ignorant at some early period of its community life." The author suggests that "the whole guild of canoe-wrights may have left Mangareva...they may have been carried away as involuntary voyagers in the canoes of some expedition which had made their home a port of call; it is equally possible that they would leave in a huff because their work was not rewarded to their taste. The tabu would remain behind them; none would venture to construct new canoes—in the second generation all knowledge of the art would be lost."

Since Laval, a few years after Beechey's visit, observed some genuine canoes, locally constructed, among the Mangarevan fleet of log-rafts, Churchill's theory seems unsatisfactory. The same author quotes Friederici on a case in which seven natives from Mangareva travelled over six hundred miles of open ocean to Rapa-iti on their log-raft, after which four of them embarked on the same craft and returned safely to Mangareva.[1] Friederici (1915, p. 210) believing like so many others that the raft in spite of everything represents the most unsatisfactory product of marine architecture and was the natural fore-runner of the double canoe, begins his reasoning at the opposite end of Polynesia and writes: "The Moriori on the Chatham Islands with its poor vegetation had degenerated still further: like the Indians with their reed-rafts on the dry west coast of America, and the early Egyptians with their papyrus boats, they built their miserable vessels of the tough flower-stalks of Phormium tenax (New Zealand flax). Finally, among the people of Mangareva the backward evolution [*die Rückwärtsentwickelung*] was yet another: from the double-canoe they got back to where they had started, namely to the wooden raft. This entire evolution with its various stages is of great interest when we bear in mind that a wooden raft of the Mangareva type, with double masts side by side and a sail stretched between them in Tuamotu fashion, has been found on the coast of the old Inca Empire; ..."

Friederici combines this observation with his reference to "the unusually great number of ethnological parallels between America and the Pacific Islands which have nowhere been adequately dealt with so far." The result is that he suspects a trans-Pacific migration upwind to America, beginning in Malaysia with dug-out or built-up boats, going through a gradual retrogression as the migrants proceed eastwards, with built-up canoe-types sporadically reverting to wash-through raft types in Polynesia, the farthest voyagers finally reaching South America with craft which he considers to represent the most primitive stage of marine evolution. The most natural objection to this hypothesis would seem to be that one should not expect the poorest type of the "degenerating" vessels to be the one which reached the farthest upwind. Also, balsa-like craft are not limited to the last of the islands nearest Peru, but emerge sporadically in all parts of Polynesia, in spite of the almost universal presence of the genuine and dominant Maori-Polynesian dug-out canoe. Thus Linton (1926, p. 102) writes in his *Ethnology of Polynesia and Micronesia*: "Balsa-like rafts made from bundles of bamboo were occasionally used in most of the Polynesian groups. The Gilbert Islanders had carefully made rafts of squared timber which were used for fishing."

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[1] Friederici (1915) also writes: "The voyage of Bligh after the catastrophe of the Bounty has first shown the Europeans what extensive voyages open boats may undertake in the Pacific Ocean. We know today, indeed, that native craft and crew are able to remain for five months in this ocean, by means of sea-animals, sharks, etc. for food, together with rain-water; and we know the history of a Mangareva craft that undertook a voyage towards the west from this remotest Tuamotu group and arrived, after a voyage of 3 700 miles, at the atoll Sikayana east of Malaita of the Solomon Islands. The distance from Mangareva to Sikayana is about equal to the distance from Mangareva to the coast of South America."

Even some of the New Zealand Maori occasionally turned to the use both of log-rafts and Peruvian-like reed-boats. In *The Maori Canoe* Best (1925 a, p. 136) includes a section on "Rafts and Floats", where he shows that during his exploration of New Zealand in 1773 "Captain Cook saw some natives at Dusky Sound. The first family seen, on the 7th April, was composed of one man, three women, and three children, who were provided with a small double canoe. ... Cook, however, mentions seeing a few other natives at Dusky Sound, who were using rude rafts composed of logs."

Best also quotes Colenso to the effect that in some parts of New Zealand, for example in the neighbourhood of the East Cape, where there are no harbours, the natives made open rafts of light wood, "on which they went out to sea for some distance." Colenso furthermore made the following remarks on some fishing-craft seen by him on the east coast of New Zealand in 1838: "I may also mention that all along the coast, in many places we saw small rafts hauled up above high water mark, each being eight or ten feet long and three or four feet wide, composed of only a few small poles, roughly and distantly but very strongly lashed together, with open spaces between them. On these the east coast Maoris went out to fish in deep water, one on each; and also, when opportunity offered, to a ship with a pig or two fastened to the raft. They said these rafts were quite safe—more so, indeed, than a small or middle-sized canoe, as there was no danger of upsetting." Best quotes Gudgeons report on a case in which a small party of Maoris crossed twenty miles of sea on rafts in order to escape from enemies behind them.

From a Maori informant the same author learnt (*Ibid.*) that a form of *mokihi*, or raft, was formerly constructed by the Ngati-Porou tribe of the east coast, who used it for fishing at sea. The material used was the *houama* (*whau*, or *Entelea arborescens*), "an extremely buoyant wood." Each log was pointed at the bow, and secured to the others by means of cross beams and lashed with the "extremely tough, strong, and pliant stems of the *pirita*, a climbing-plant (*Rhipogonum scandens*)." Some Maoris transferred the principle of their double-canoes to their log-rafts, and connected two rafts side by side with cross poles. When required, a platform was raised on the rafts by means of additional cross poles. No mention is made of sail, but we learn that these rafts "were provided with a stone anchor... Should a foul wind spring up when men were fishing off shore from a *mokihi*, then would they cast their anchor and ride out the wind. The water would sometimes break over the raft, and spray drench its small crew, but the rude craft was particularly buoyant, and rode like cork. . . . In former times it was not an unusual occurrence for fishermen to be blown out to sea by sudden gales, to be lost for ever on the great waters."

Best's description of the Maori log-rafts ends with a direct comparison with the craft of aboriginal Peru (*Ibid.*, p. 141): "The log-raft (balsa) seems to have been used on the west coast of South America from Paita northward to Darien." He includes a brief description and even illustrates his work on Maori water-craft with a sketch made from Juan and Ulloa's illustration of an Ecuadorian balsa raft. He furthermore refers to Spilbergen's drawing of the balsa raft seen by him at Paita, Peru, in 1615, as well as to Inca Tupac Yupanqui's deep sea expedition into the Pacific. No reason is given for this digression into Peruvian ethnology and history, and no conclusion is drawn.

Best finally turns his attention to the other deviating boat-form in New Zealand, the reed-boat (*Ibid.*, p. 137): "The other type of raft mentioned by Colenso may be described as a float, though both timber raft and reed or bulrush floats were called by the same names—*mokihi*, and *moki*. There were two forms of these floats: one was a small affair, a bundle of dry bulrushes or flower-stalks of *Phormium*, which a person bestrode, paddling with his hands or a piece of wood; the other was a more elaborate and a larger float, composed of several or many such bundles lashed together so as to resemble a boat in form."

He quotes Brunner, who wrote of these Maori reed-boats more than a century ago: "A raft of this kind is now but seldom seen. I will therefore give a description of its construction: A sufficient quantity of the dry flower-stalk of the flax (*Phormium*) being collected, which is not done without considerable labour, it is lashed tightly into bundles, each about ten inches in diameter, and twenty to twenty-four feet long. Two of these bundles are then placed side by side, and are equivalent to the garboard streaks or planking next to the keel of a boat. They are left with square butts aft, and the natural bend of the stalk being taken advantage of, the bundle is formed convex in its length towards the water; the top or slender part of the stalk is placed forward, and the pointed end of the bundle becomes the head or cutwater of the craft. Two other bundles similar to the first are now lashed outside and slightly above them, and the four form the bottom. Projecting gunwales are now formed of two additional bundles, which are placed over and slightly outward of the last; and the inner, hollow part of the raft being filled up with the refuse stalk, with a pole placed lengthwise to give it strength, the vessel is complete. Paddles have then to be cut, and a mast with a blanket sail may be rigged if the wind be fair."

It is most remarkable that this singular and intricate type of reed-boat is found among wood-carvers and canoe-builders, in a part of the world which abounds in buoyant wood. The amount of flax required was not collected without considerable labour, and when Brunner's little party of four men put the reed-boat into the water to cross a broad river, they noticed that the flax-stalk used was "of an absorbent nature" and before they had far passed the middle of the stream they found "by the decreasing buoyancy of the craft, that it was necessary to throw overboard the dog." It seems quite clear that the Maori reed-boat is a reminiscence of some craft belonging to a land scarce in wood while possessing a buoyant type of reed for which the water-absorbent Maori flax-stalks were merely a poor local substitute.

Polack (1838, Vol. II, p. 221), an early trader at the Bay of Islands, wrote: "Among the early occupants of New Zealand canoes were made entirely of the bulrush. We have seen, between Kaipara and Hokianga, one of these vessels of olden time, nearly sixty feet in length, capable of holding as many persons, but they are wholly in disuse. They were remarkably thick, formed entirely of rushes, except the thwarts, and resembled the model of a canoe in every particular. They were remarkably light...though many bundles of rushes were consumed in forming them, and were paddled with much velocity, until saturated, when they settled down in the water. These vessels are no longer formed, and specimens are extremely rare." Again, the same writer remarks: "On the shore, half buried in drift sand, lay an ancient canoe, made solely of the *raupo* bulrush. It was about forty feet in length, and had been neatly put together. These vessels of the olden time are not to be found in use at the present day, though bundle of these rushes are often tied together to enable a person to cross a stream."[1]

Best (1925 a, Fig. 98, 98 a) reproduces a copy of an old sketch of such a Maori reed-boat, captioned "The Built-up or Boat-like Form of Mokihi," and beside it he introduces another sketch depicting a very similar type of craft, captioned "A Balsa, or Reed Boat of Peru." His own comment is (*Ibid.*, p. 142): "On Lake Titicaca the natives construct floats or rude boats of reeds resembling the *mokihi* described by Brunner." (See Plate LXXX **5**, **6**.)

The Maori reed-vessel of nearly sixty feet seen by Polack, capable of holding as many persons, calls to mind the very largest Peruvian reed-vessels depicted in some of the Early Chimu art. (See Plate LXXXI **1**.) But not only are the log-rafts and the ingeniously built-up reed-boats of ancient New Zealand directly comparable to the boat-types of aboriginal Peru; so are even the small one-man Maori reed-floats described by Colenso. (See Plate LXXX **3**, **4**.) Of these Hornell (1931, p. 354) writes: "A still more primitive form of the *mokihi*, as these rafts were called, was analogous to the *caballito* of Peru astride which the fisherman sits, propelling himself by paddling." To this comparison the same author adds, with reference to the problem of the origin of the South American balsas (*Ibid.*): "A detail which may have considerable bearing upon the elucidation of the problem under consideration is the fact that in the binding together of the reed bundles of the Titicaca *balsas*, plaited reed braid is used instead of cord laid in the manner of rope. The Polynesians similarly employed plaited braid for all kinds of lashings, but in their case it was made of coconut fibre, the most suitable material available to them. The 'sennit', as it is called, is made by exactly the same technique as the reed braid of Peru."

Roughly four hundred miles east of New Zealand lie the lonely Chatham Islands, occupied by the Morioris, who in many ways seem to be survivors from the early Polynesian era—racially because of their often strongly hooked noses and frequently reddish-brown *uru-kehu* hair, and historically because they claim that some of their ancestors were refugees from early New Zealand, fleeing when the warlike Maori settlers arrived in their canoes. Shand (1871, p. 354) in his early paper on "The Canoes of the Morioris", shows that there were four types of Moriori water-craft, all much alike and all wash-through raft-boats. Neither dug-out nor plank canoes, nor the outrigger, was known in this group. The *waka puharo* (or *korari*) was 30-35 feet long, had two "keels" represented by two poles, while the bottom and sides were made of the dry flower-stalks (*korari*) of flax (*Phormium tenax*) lashed to a slight wooden framework. The water could pass freely through the hull.

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[1] Polack is also quoted by Best (1925 a, p. 140), and Skinner (1919, p. 67).

The *waka rimu* was a similarly built raft-boat, but had its sides and bottom covered only with pieces of bull-kelp (*rimurapa*). The *waka pahi* (or *pepe*) was the real deep-water vessel of the Morioris, measuring up to fifty feet over all, but was built on the very same wash-through principles. It was ornamented with a carved stern-post of akeake wood about twelve feet high. According to another publication by the same author (Shand 1894, p. 85) these raft-ships were large enough to carry 60 to 70 people, and undertook oversea voyages between the various islands of the group, involving crossings of 15 miles or more. We learn from the same authority that these raft-canoes never had sails. It very often happened that craft and crew were caught in a storm and were carried off into the ocean, never to return. Finally, the *waka ra* was a reed-boat made of brackenstems (*Pteris*) and the dry flower-stalks of *Phormium*, and in its construction it "was much the same as a New Zealand mokihi". This Moriori *waka ra*, or "boat of the sun," was principally used in a ceremonial manner on the Chatham Islands. "Rude images of men, from twelve to twenty-four in number, were placed in it, each with a paddle tied to its hands, and the rude vessel with its singular freight was set adrift upon the ocean. One authority states that it was so launched from the place on the eastern side of the main island where a cave is seen, at a time when a westerly wind was blowing. It was from that cave that spirits of the dead were believed to depart on their journey to the spirit-world." (Best 1925 a, p. 143.)

Many writers have speculated as to the absence of canoes and the presence of balsa-like raft-boats among the Moriori, and the only explanation given is the scarcity of good quality wood among the limited forest-timber found on the Chatham Islands. This may help to explain why in this group already existing reed-boats would have a greater chance of surviving than the intruding dug-out canoes, but it does not otherwise give a satisfactory answer to the whole problem of Moriori marine architecture, since there are other tribes in Polynesia, like the Easter Islanders, who had less timber available than the Chatham islanders, and yet sewed watertight canoes together from irregular pieces of drift wood. A hull like that of the deep-sea Moriori *waka-pahi* could indeed have been made waterproof by the Maori-Polynesian method of sewing wood, or by covering the framework with seal-skin, of which the Morioris otherwise made so much use. But—with a purpose—this was not done, for as Shand again says with regard to the Moriori (1889, p. 148; italics by T. H.): "As will be perceived, the water washing through the body of the canoe made progress rather slow; but, being skilful and daring navigators, they took advantage of the tides, which run very strongly round the coast, ... Further, they say that, owing to their peculiar construction, *these boats were safer in rough weather than a Maori canoe or a whale-boat*—not shipping water, or, when spray came over, it ran off without doing mischief; and requiring a very heavy gale to capsize them."

In other words, the Morioris had acquired the typical Peruvian principles and secrets of safe architecture for deep-sea-going small craft. This will suffice to explain why, as Friederici (1915, p. 210) expresses it: "They built their rude vessels of the tough flower-stalk of the *Phormium tenax*, resembling the reed-balsas of many of the Indians along the dry west coast of America..."

Skinner (1919, p. 67), in his paper on "Moriori Sea-going Craft", wrote: "It will be seen that the Moriori 'wash-through canoe' differed fundamentally from the ordinary dug-out canoe of the Maoris, and this has been made one of the grounds for rejecting a close racial connection between the two peoples." But describing respectively the former Maori log-rafts and reed-boats, as recorded by Colenso and Polack, the same author shows that the Chatham Island raft-boats may very well have been a specialization of the same early Maori principles of marine architecture. In a later paper, while discussing the origin and relationship of these raft-boats, Skinner (1923, p. 119) quotes J. M. Brown concerning the Morioris: "Their *waka-patu* (*waka-pahii*) remind me of the balsas or buoyant rafts of the Peruvian coast. On Lake Titicaca, I saw canoes made of reeds of much the same type (i. e. wash-through) as the Moriori, ..." Pointing again to their similarity to the New Zealand reed-boats, Skinner holds that "we need not go so far afield as South America for comparative forms." Yet, with regard *both* to New Zealand and the Chatham Islands, South America does offer an answer to the question of origins. The reed-boats had there a distribution area ranging from the central coast of Chile to the Andean lakes of San Pablo and Yahuár-Cocha just to the north of the equator. (Knoche 1930 b, p. 205.) They appear sporadically even as far north as Mexico. (Brindley 1931, p. 16.)[1]

It is interesting to note that the Aymara word *totora* is used by the Indians of Peru to denote the water-resistent reed [*Scirpus tatora* Kunth = *S. californicus* (C. A. Mey) Britton] which they select for making their buoyant water-craft on the coast of the barren desert areas. (Parodi 1932, p. 145.) *Totora*, occasionally *tutura* or *tortora*, is therefore widespread in Peru as a term for the most important locally growing and very buoyant building material for water-craft. (Yacovleff and Herrera 1934, p. 293; Macbride 1936, p. 290.) Now, in New Zealand, the tree most commonly used as building material for canoes is called by the Maori *totara*. (*Podocarpus totara*; Hochstetter 1863, p. 158.) Best (1942, p. 130) shows that the *totara* is probably the most important tree to the local aborigines, since its name is referred to in their earliest songs and legends, and the Maoris have the ancient proverb: "there is the *totara* forest to ride the angry billows." The same word was apparently important also in ancient Chatham Island ship building, for as Travers (1876, p. 18) points out, Shand heard some old Morioris singing a song of rejoicing upon the completion of one of their wash-through reed-rafts, "during which they used the words '*totara*' and '*pohutu-kawa*'; and, on being questioned as to those words, they mentioned that they were the names of trees in the country from which some of their ancestors had come."

On Easter Island, also a peculiar reed-craft, strikingly similar to the reed-*caballitos* of Peru, were known and used by the aborigines. Petit-Thouars (1841, Vol. II, p. 231) was much surprised when the natives of Easter Island came out to his ship each of them "riding on a reed roller." An illustration of these peculiar water-craft, reproduced from Petit-Thouars' original drawing, appears in Plate LXXX **2**, and the close analogy to the smallest reed-rafts of coastal Peru and Chile is most apparent. (Plate LXXX 1.) Métraux (1940, p. 208) writes:

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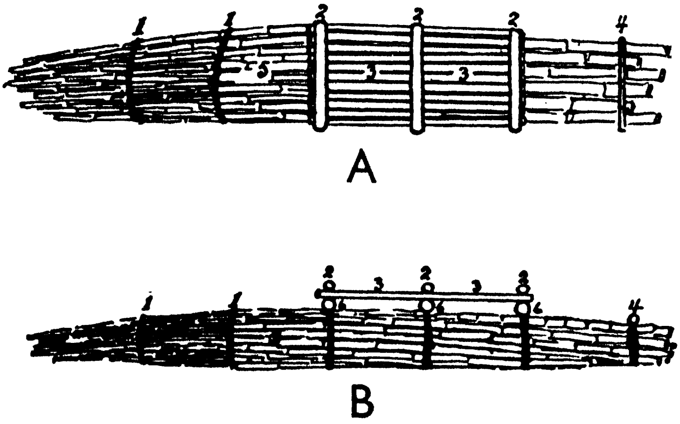
[1] Brindley (*Ibid.*) writes: "The reed- or cane-bundle canoes of the Seri Indians of Mexico are a distinct advance on the last example in being constructed of three bundles with the middle bundle shorter and lower than the two others, so that it forms a floor about 10 ft. long between the main bundles, which have a length of 27 ft. and taper into very long uprising ends. This construction gives graceful sheer the whole length, and a remarkable resemblance to the papyrus-bundle canoes of Ancient Egypt. The Seri canoes are used for coastal fishing in the Gulf of California, and are said to have excellent sea-going properties." And (*Ibid.*, p. 13): "This is a very ancient craft, for the reliefs of Nineveh show the then inhabitants of the Marsh Country and the Assyrian invaders embarked in reed-bundle rafts which are canoe-like in having both ends pointed and slightly turned up."

"The Easter Islanders used rafts (*pora*) made of bulrush mats, rolled into big, conical bundles. The swimmer reclined on the thicker part of the bundle, which he grasped firmly with his hand while he paddled with his feet. According to my informant some of these bundles were 7 feet long and could be used simultaneously by two persons. . . . The carrying of food in *pora* was often described to me by islanders and said to be the usual method for taking food to the *manu-tara* egg hunters on Motu-nui."[1]

In our discussion of the South American element in the Easter Island flora (p. 473 ft.n.), we have already mentioned the Peruvian affiliations of the Easter Island reeds.

On Easter Island also the double-blade paddle (*mata kao-kao*) has survived, as used on the small *caballitos* of Peru and Chile. Thomson (1889, p. 537) states that they are "made of heavy wood, balanced by wide blades ornamented with outlined faces. Used in the ancient canoes in a similar manner to that practised by the Indians of America."



Raft from Leeward Islands. (From Handy 1932.) A top and B side view; 1 lashings of *purau* bark; 2 cross-pieces; 3 poles used for decking; 4 binding pole at stern; 5 bundle of long bamboos constituting body of raft; and 6 cross-pieces supporting deck.

Handy (1932, p. 57) quotes Corney in a general reference to the use of "rafts of timber and bamboos" in the Society Islands in ancient times, and he describes in detail a balsa-like bamboo raft observed in use for transporting chunks of coral in Raiatea. (See figure above.) Enock (1912, p. 279) writes: "The pahi, or 'raft-boat,' of Tahiti somewhat resembles the balsa of Peru, it is said."

In the Marquesas group rafts were formerly used, and are referred to in some recorded oceanic voyages. Huge rafts were here generally constructed from extremely thick bamboo. The old natives of Fatuhiva still speak of an attack made by neighbouring tribes upon the inhabitants of Manuoo Valley, with the direct result that, to save their lives, the whole population of that district—men, women and children—embarked upon a number of large rafts made from thick bamboo securely lashed together. They stored coconuts, *poi-poi*, and other provisions on board the rafts, as well as fishing gear, and a fresh water supply in large bamboo canes with pierced joints. And thus they all deserted the island in a body. Years later one of these refugees returned to Uapou Island in the Marquesas group, bringing the news that his party had landed safely on an atoll in the distant Tuamotu group.

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[1] Motu-nui is an uninhabited bird island off the coast of Easter Island.

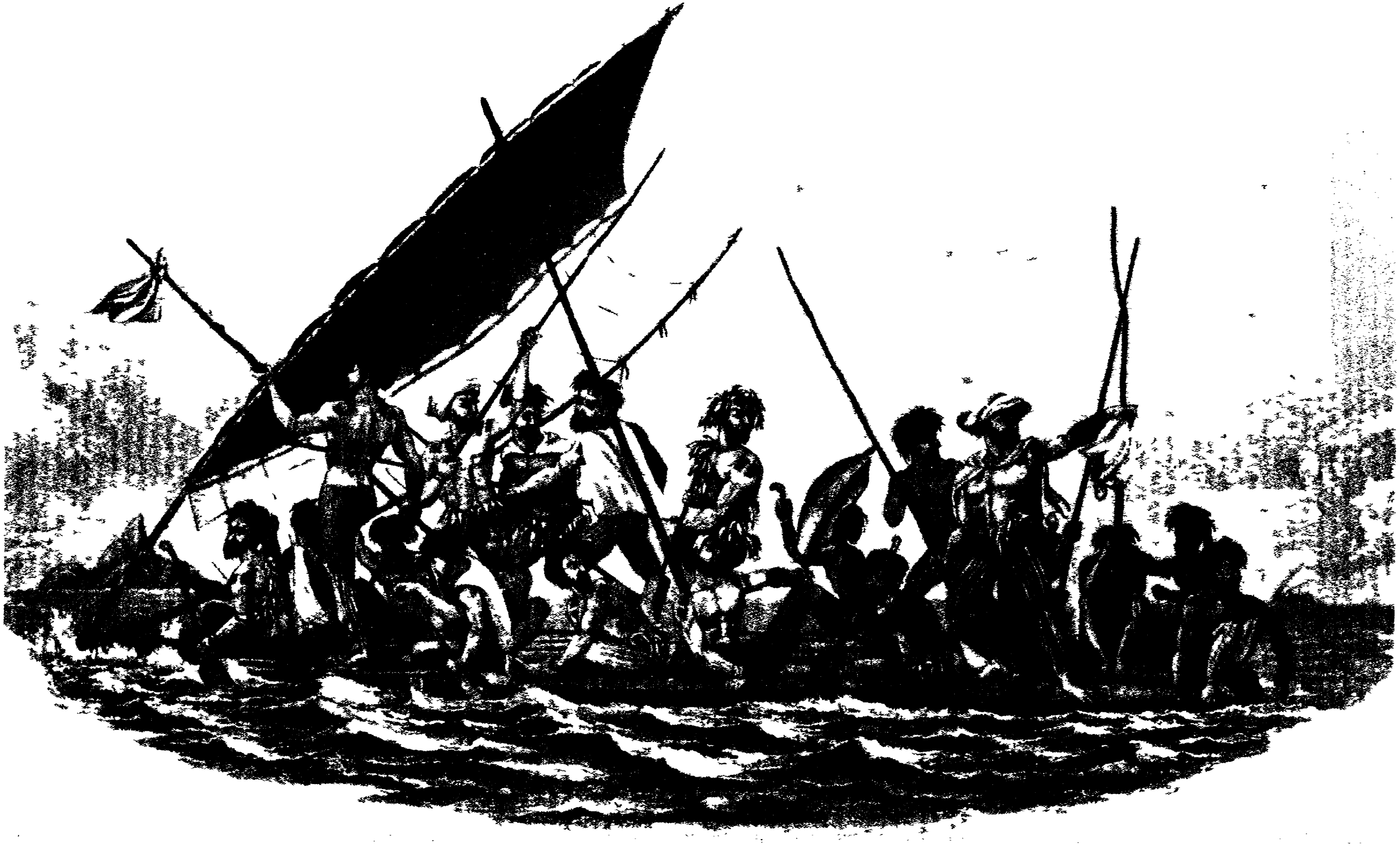
Handy (1930 a, p. 137) found a very ancient tradition on raft voyaging in the same group: "A bamboo raft, built with five levels, two below the water and three above, is said to have been built by the people of the chief Hepea-Taipi, living above the valley of Hanaupe, who took flight in it after defeat in war. With this craft a voyage was made to Hawaii and back. It was as a result of this voyage that the people of Hivaoa knew of Hawaii."

We have previously mentioned the probability that the coconut reached the early Marquesans on a raft rather than in an ordinary canoe, the local term for "raft" being *pae-pae.* We have also shown that the natives in the Tuamotu group immediately distinguished the Kon-Tiki balsa raft as a *pae-pae*, telling its crew that such craft were well known to their ancestors and were described in their earliest songs and traditions as *pae-pae* or sometimes as *rongo-rongo.* The raftsmen of Mangareva also referred to their own rafts as *pae-pae* (Seurat 1905, p. 483), and the Chatham Islanders used the same term to designate the largest raft-boats by which formerly they crossed wide stretches of ocean. (Shand 1911, p. 86.) In Tahiti, too, *pae-pae* is the word for rafts in general. Throughout Polynesia *pae-pae* appears in the various dialects, meaning either "raft," "flooring," "platform," "to place in a row," "to lay in order," or also "to float," "to drift," "to go to leeward." On Easter Island the name for the original raft has apparently outlived the local change of boat-type, since the islanders refer to their own canoes as *pae-pae.*

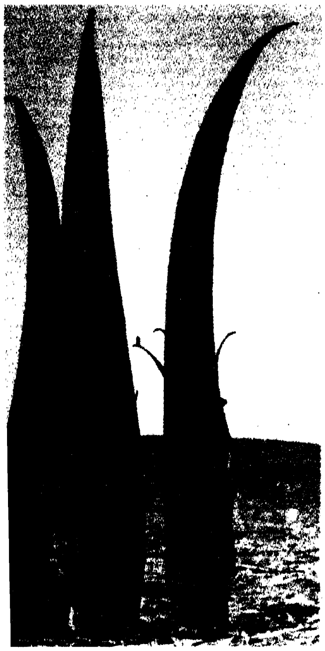
In Haddon and Hornell's great work *Canoes of Oceania* (1936) a review of available evidence causes the authors to reach a conclusion entirely in line with our present working hypothesis in regard to the vestiges of early Pacific raft navigation. Referring to Handy's description of the Society Islands balsa-like raft, Hornell (*Ibid.*, p. 144; italics by T. H.) writes: "This information brings the Society Islands into line with the Marquesas Islands and with Mangareva, Samoa, Tonga, Fiji, and New Zealand, whose people were all well acquainted with the navigational use of rafts. It supports the view that *rafts were utilized freely in some at least of the movements from island to island of the first migrants into Oceania.*"

Referring to the Chatham Island boat construction, the same author writes (*Ibid.*, p. 219): "It seems probable that this type represents a specialized development of a form of raft used by the Moriori when they lived in New Zealand, and lends weight to the hypothesis that *much of the earliest movement in the Pacific was effected by men who employed some form of sailing raft in their voyaging from island to island.*"

We may end our review of rafts in early Polynesia by quoting a description from White's (1889, Vol. I, p. 173) *The Ancient History of the Maori, His Mythology and Traditions.* We are here probably confronted with the oldest traditional description of boat construction ever preserved in Polynesian memory, since it deals with the type of craft built for ocean voyaging by their very first progenitors at the time of "the deluge," which supposedly took place long before the progeny of Tiki set out for their final Polynesian home. We hear of the earliest ancestors in the Fatherland cutting down various types of "light-timbered trees, which they dragged together to the source of the River Tohinga. They



Polynesian sailors from Mangareva meeting the European discoverers with sea-going rafts. (From *Beechey 1831.*) Canoes had displaced rafts in most parts of Polynesia at the time of European discoveries, but in the Gambier group of southeastern Polynesia the first European visitor, Beechey, saw only great numbers of rafts. (Note growth of beard on the strangely composite race found by Beechey.)



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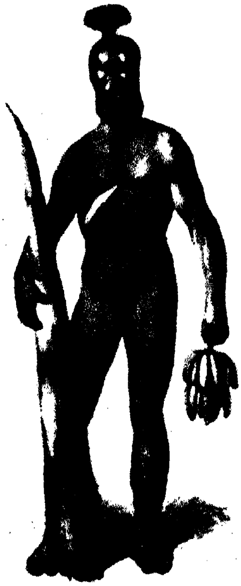

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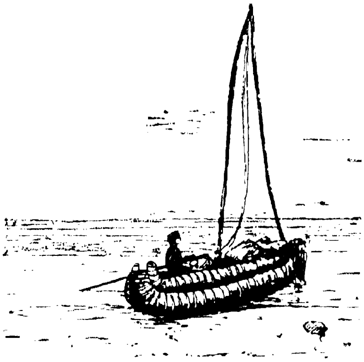

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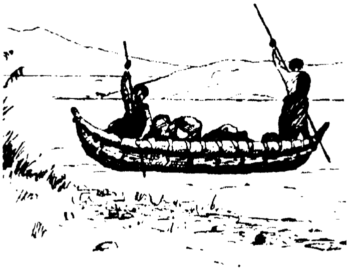

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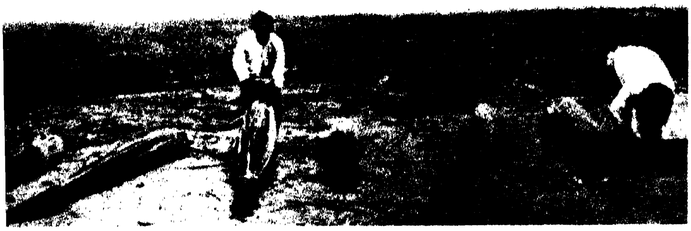

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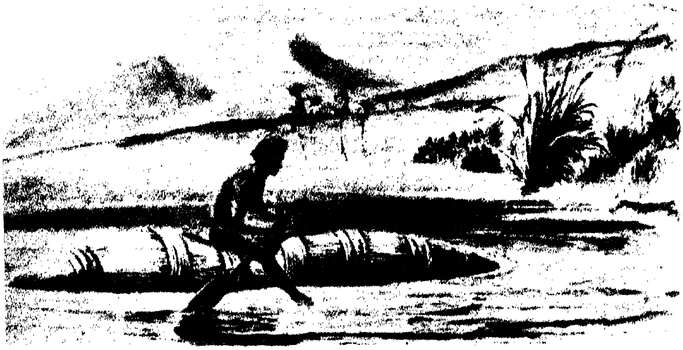

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Plate LXXX

Reed-floats and reed-boats of aboriginal Peru and Polynesia. **1** and **3,** for coastal use the ancient fishermen of the desert areas of Peru and Chile made tusk-like bundles of reeds on which they sat astride with their feet in the water. (From: 1 *Antze 1930*; 3 *Lothrop 1932*.) **2** Old drawing of native Easter Islander with the same singular type of water-craft or float. (From *Petit-Thouars 1846, Atlas*.) **4** Coastal reed-bundle vessel in aboriginal New Zealand. (After *Taylor* in *Best 1925 a*.) **5, 6** Larger built-up reed-bundle boats; **5** at Lake Titicaca, Peru, and **6** on lake in aboriginal New Zealand. (Both from *Best 1925 a*.)

Plate LXXXI

Iconographic art from coastal North Peru. **1** Double-decked raft-ship on ancient Chicama vase. (From *Schmidt 1929*.) **2** Mythical bird-man ready to board his ship; and **3** pearl-shell divers secured by ropes to crew on raft. (From *Lothrop 1932*.) **4** Victors with prisoners, Chimbote; and **5** ocean-bound fishermen carrying net with gourd floats. (From *Schmidt 1929*.)

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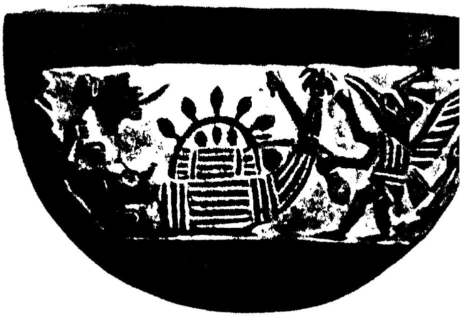

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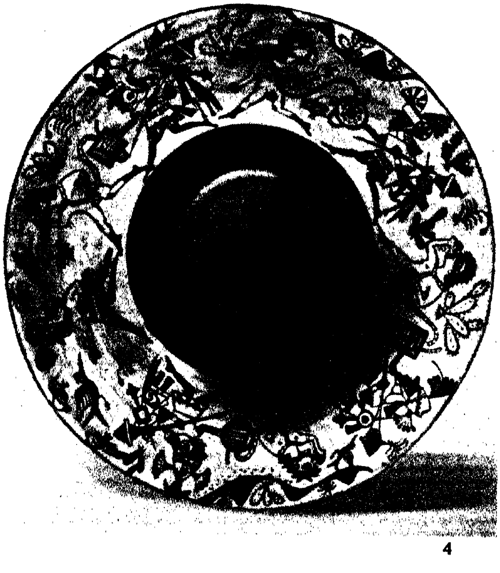

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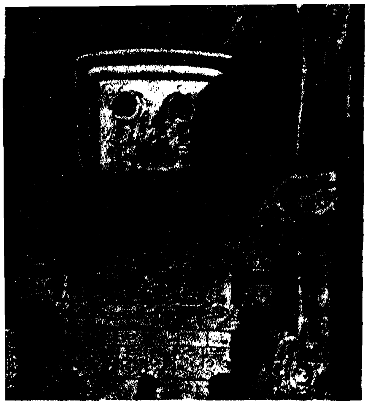
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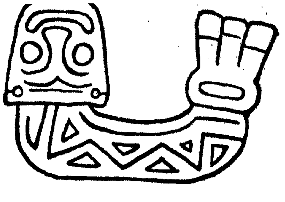
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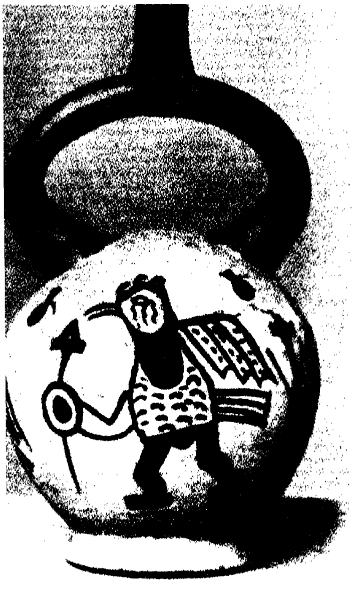
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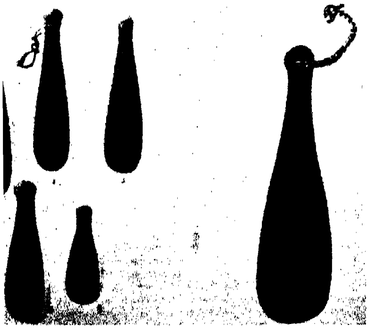
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1 The solar figure of the Gateway of the Sun, Tiahuanaco (*Means 1917*), **2** one of the bird-men at his side (*Posnansky 1914*), and **3** detail of his pectoral. **4** Easter Island pectoral with hieroglyphic bird-man inscriptions (in *British Museum*). **5** Bird-man, coastal North Peru. (*Schmidt 1929.*) **6** Bird-men at Orongo, Easter Island. (*Routledge 1919.*) **7** Maori stone clubs compared with one found in Inca grave. (*Brown 1924.*) **8** Palaeolith from Chilian grave (right) compared with two from Easter Island. (*Aichel 1925.*)

bound the timber together with vines of the *Pirita* and ropes, and made a very wide raft (*Moki*)." They also "built a house on the raft, and put much food into it, fern-root, *Kumara*, and dogs."

Rafts and megalithic activities

The combined association of the form of ocean raft just described, sweet-potatoes, and dogs, with the period antedating the first migration into Polynesia, is at least interesting. So is the association of rafts with megalithic transportation in Polynesia.

We have already seen (Part VI) that paved ways or slides run down to landing-places well adapted for rafts near some of the stone constructions on Easter Island and certain other island groups. The view has therefore been put forward by other observers that rafts were used in some of these cases for the coastal transportation of stone. This suggestion is strengthened by the evidence already cited that rafts were used for the transportation of "chunks of coral" in the Society Islands and of "the cyclopean masses used in the construction of their megalithic monuments" in the Tonga Islands. The ocean distances over which some of these megaliths have been transported are stressed by McKern (1929, p. 6), who says in his work on Tonga: "Stone structures were found on islands where no quarries could be located, and stone quarries on islands where there are no stone structures. That large stones were carried over considerable water distances is evidenced by the fact that no stone structure, aside from one small burial cist, was found on Motutapu or on any neighbouring island closer than Tongatabu, whereas stones 6 feet wide and 10 feet long have been removed from the Motutapu quarries."

Rafts were associated with the megalithic work not only in Polynesia, but also in Micronesia. McCarthy (1950, p. 138) writes: "The basalt columns were brought on rafts from quarries on the north coast of Ponape." Similarly Christian (1899, p. 83) states: "Kubary adds that the blocks of basalt were rafted down from the Not district on the north coast. This tallies exactly with what Nanchau of Mutok and the Au of Marau told me..." In Kusaie, too, available archæological evidence indicates that rafts were used in transporting the colossal basaltic blocks down the coast from the distant part of Ualan. (Hernshein 1883.)

While the slim streamlined Northwest Indian and Maori-Polynesian vessels are ideal war-canoes for fast manoeuvres, the sturdy wash-through rafts are far more suited to slow cargo work. As such they had apparently also served their purpose in early Peru. In his monograph on the megalith site of Tiahuanaco, Posnansky (1914, p. 30) writes: "As the present author has proved in his various publications, the inhabitants of Tiahuanaco brought part of their Andesitic stone-material to the building site in great reed-ships, balsas de totora, from the volcano Kchap'héa, [also spelt Kapia], which lies fifty km [about 30 miles] away from the ruins."[1]

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[1] The Tiahuanaco ruins are located about twelve miles to the south of the shore of the lake, and about thirty yards above its surface. As is well known, the brackish Lake Titicaca has no true outlet, only Rio Desaguadero which links it up with the equally salty Lake Poopo to the south in the same highlands. A constant change in the water-level of Lake Titicaca is experienced even in our days, and Posnansky has defended the view that the now decreasing lake formerly extended to the immediate neighbourhood of the present Tiahuanaco ruins. His view is partly based on the remains of a wide canal system surrounding the ruins (see Posnansky's original map of 1914; reproduced by Bennett 1934, p. 370; Rydén 1947, p. 17), with vestiges of former megalithic wharves. (Posnansky

In view of the size of some of the quarried stones thus transported on Lake Titicaca, Posnansky holds that much larger craft than those still surviving with the primitive fisher population of the district must formerly have been built on the lake. This is not incredible, for, even today, as Verrill (1927, p. 204) shows: "These Lake Titicaca balsas vary in size from tiny one-man canoes to immense cargo boats or lighters carrying huge sails. In every case they are constructed of bundles of reeds lashed together in cylindrical form. Two or more of these bundles are then lashed together, sometimes in double or triple layers, in such a way that the bows and sterns are slightly cocked up. Around the edges of the whole are low gunwales of reeds tied together. On the larger craft, a superstructure or platform of wood and even a tent, shelter, or cabin may be erected." We have seen that even cattle and horses are transported on the large and stormy mountain lake by such reed-boats.

Some problems connected with relationships and differentiations of raft-types

The Titicaca reed-rafts went under sail, and were in fact the only vessels in Inca Peru, other than the log-rafts, definitely known to have employed this means of propulsion. We have seen with Inca Garcilasso that on the coast of Inca Peru only the large log-rafts, and not the small reed-vessels or *caballitos*, were able to use sail to any advantage of the crew. Hornell (1931, p. 352) points out the analogy between the rig of the southern highland reed-rafts and that of the northern coastal log-rafts, writing: "It is significant of the probable community of origin of this log-*balsa* and the reed-bundle *balsa*, that both appear to have the same general rig; each has the mast formed of two poles, rigged in inverted V-fashion, with a rectangular sail slung from the point of junction of the two poles. As in the Titicaca *balsa*, the head of the sail in the log-*balsa* is extended upon a yard, the foot being free. Steering is done as in Titicaca by means of a large paddle operated by a man seated at the stern on the end of the middle log. Lee-boards are also employed [i. e.: on the log-*balsas*]." Later, while stating that there can be no doubt concerning the prehistoric use of sail on Peruvian log-rafts, he wrote of the larger type of reed-rafts on the same coast (1946 b, pp. 42, 81): "Whether they carried mast and sail is unknown, though by analogy with those of Titicaca it is probable that the larger ones were so equipped."

Lothrop (1932, p. 240) follows Hornell's reasoning on this point, after having first said of pre-Columbian sail on *larger* craft in Pacific South America, that, "we believe that they were in general use on the Peruvian coast." To support his view he points to the archæological centre-boards of southern Peru which, however, only serve to show that *log-rafts* used sails in those parts during early prehistoric times. But he adds: "A second important point is that the sails found to-day on reed balsas of Lake Titicaca are not set on a single

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1912, p. 4.) Bennett (1934, p. 385) shows that there is sand under Posnansky's Tiahuanaco docks. The same author also writes (in Steward 1949, p. 57): "...canals connecting navigable streams were made in the Mojos region of eastern Bolivia, by excavating ditches parallel to the raised causeway-like roads. One of these canals is over 6 m wide and 2 000 m long, and another is reported to be about 10 miles long but only a few feet in width." And (*Ibid.*, p. 58): "Around Lake Titicaca, in the past as today, canals were cut through the marshy shore to serve as approaches for the balsa canoes. Likewise, in a few places, rough stone ramps were built for landing piers." For the geology of the Lake Titicaca region see Newell (1949).

mast in European fashion, but on sheers after the manner of an Ecuadorian *Jangada* [balsa raft]. It seems improbable that this device was invented independently in each case and that the highly developed peoples in the intervening territory were ignorant of it."

This is all too obviously true when we think of the highly developed Peruvian communications. Since Inca nobles from Cuzco were met by the arriving Spaniards aboard sailing balsas at Tumbez and on Puna Island, how could any part of their country remain ignorant of the sail which was used at both its extremities?[1]

As the mast and sail are only in exceptional cases depicted on petroglyphs and other ancient illustrations of Viking ships, so also in early Peru all the artist's attention is concentrated on drawing the main body of the craft and the mythical crew on board. (Halldin 1950.) Only one early picture of a Peruvian raft, among those known to the present author, shows what appears to be a mast and a wind-filled sail. (See Plate LXXXI **3**.) Several, however, show reed-boats of larger size and more elaborate construction than any built on the coast in historic time. (See figs. on page 588 and 589, and Plate LXXXI **1**.) Reproducing four such Early Chimu illustrations of reed-boats manned by mythical persons, Means (1942, p. 11) writes:

"In every case the hull is clearly composed elaborately of firmly bound together reeds. Above the hulls we see a sort of 'tween decks or hold in which supplies in pots and even persons could be stowed. Above the hold comes a deck upon which we see stationed the principal personages on board.

"What manner of craft these reed boats can have been and for what purpose beside fishing they can have been used we are at a loss to imagine. Certainly, they were far more elaborate than the small and simple reed rafts seen centuries later by the Spaniards and described by the Chroniclers... These reed boats, with their holds and their decks, must have been of considerable size. To judge by the amount of provender which three of them are shown to contain, they must have been intended for journeys of some length. But this brings up the question of how long would any reed boat successfully withstand the buffeting of the waves. Furthermore, how could so top-heavy a ship without any hint at a keel or other bottom-side make-weight stay right side up? These and other questions that will readily suggest themselves to anyone versed in boat-building are unanswerable in the light of the scanty evidence provided by these four pictures."

Means (*Ibid.*), for want of historic evidence, seems inclined to believe that perhaps these prehistoric designs are after all merely "aesthetic and mythological compositions" of the early Chimu artist. We find it difficult to believe this. Certainly the designs do represent some mythical event, and the swift motion of the craft along the surface of the sea is figuratively shown by giving running legs to the raft, but this, like so many other

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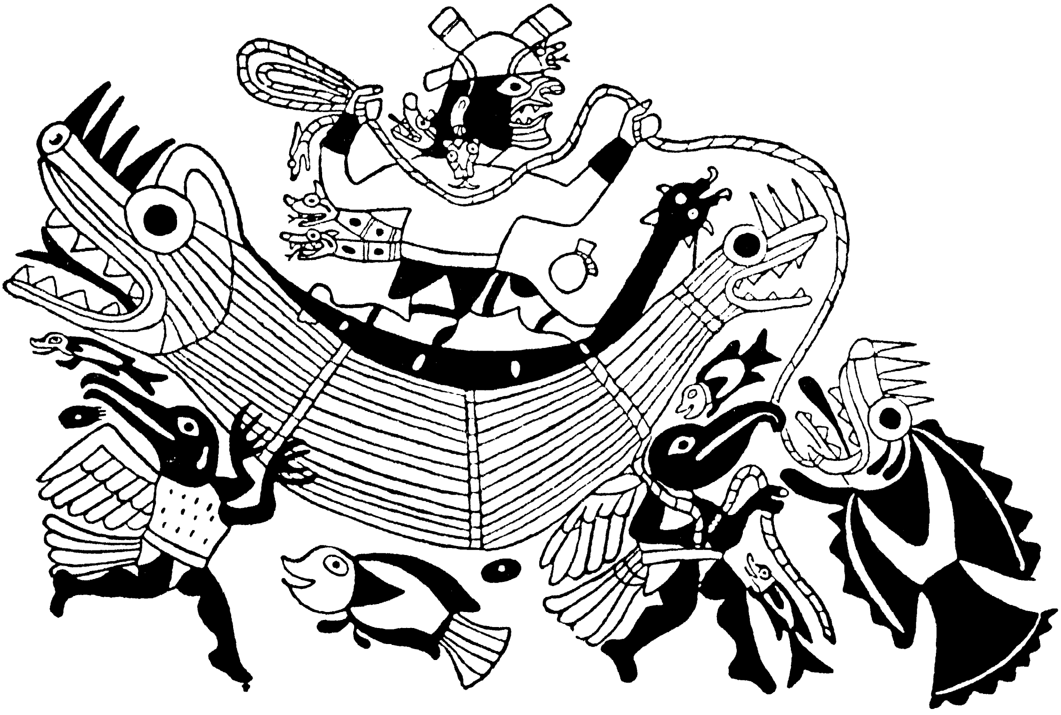
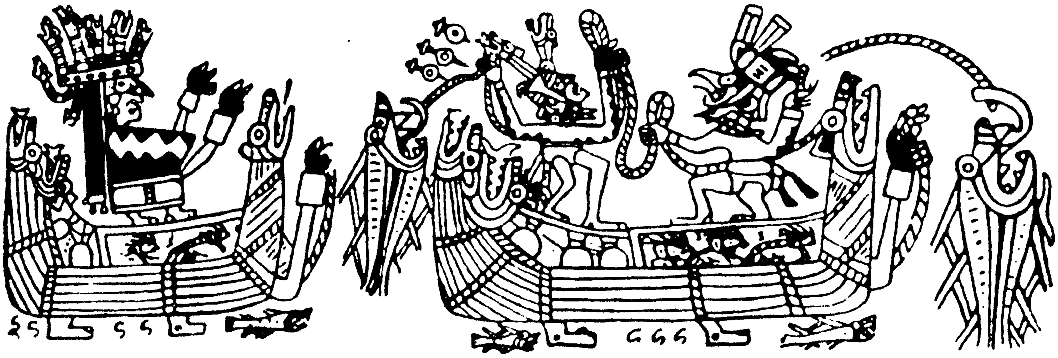
[1] The early Spaniards state that the running Inca messengers were able, by their organized relay system, to cover up to 150 miles in one day, and brought the highland Incas fresh fish up the steep hills from the Pacific ocean in two days. (Cobo 1653, Bk. XII, Ch. 32.) Montesinos was told that these runners could even bring the fish alive into the Andes. He writes (1642, p. 33) of the pre-Inca king Inti Capac: "Of this speed also the king availed himself when he craved some dainty which was not to be had in the province where he was. And thus, in later years, when the kings subjected Quito, and were wont to dwell there for long periods, they ate fish from the lake. And fishes caught in the sea at the port of Tumbez were carried alive to the king at Quito, which is more than one hundred leagues away, in twenty-four hours. This courier-service was called *chasqui*, which is to say, "he who receives," because one man took and received the message from another." (See also Bennett 1949 b, p. 613.)

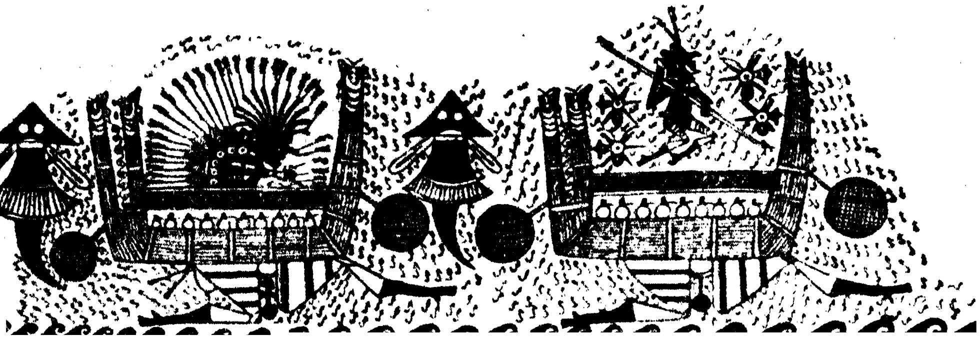


Mythical Chimu fishing scene. (From Joyce 1912.) An early Peruvian culture hero, assisted by hook-beaked bird-men, is shown fishing from a reed-boat with double stern.



Ancient Chimu boat design. (From Leicht 1944.) Mythical fishermen and culture heroes are depicted on double-decked reed-boats. Note crew and cargo under deck, and feet underneath the craft which symbolize the forward motion.

aspects of Early Chimu iconographic art, is only an example of the typical use of ideograms and symbolic patterns. The 40 and 60 feet reed-ships of early New Zealand, described by Polack as able to carry scores of men were at least not inferior in size and capacity to those depicted by the Early Chimu artists. There is every reason to believe that these reed-ships, if favoured by the Early Chimu mariners, possessed valuable qualities not known to us



Ancient Chimu boat design. (From Leicht 1944.) Mythical representation of culture heroes or deities voyaging with double-decked reed-boats. Note the double sterns which may indicate a plough-shaped construction, the water-bottles under the deck, and the running legs symbolizing the speed through the waves.

because the wash-through boat principles in general are alien to our marine architecture. Three problems are involved: the ability of such reed-ships to resist the buffeting of the waves, their ability to resist the absorption of water, and the means to prevent them from capsizing under the weight of crew and cargo.

From personal experience I can verify that the Peruvian *totora-reeds* are tough and flexible enough to permit bundles securely lashed together with *hennequin* ropes or *bejuco* lianas to withstand almost any mechanical action of the seas, provided they do not—like their New Zealand replicas—gradually absorb water and so lose their great buoyancy. The strength of the reed-cones is sufficiently demonstrated by their use in the open ocean surf and swells all along the Peruvian coast. Few of the early Spaniards found these reed-rafts and their qualities of sufficient interest to warrant more than a casual comment, but the following narrative of Acosta (1590 b, Vol. I, p. 150; italics by T. H.) will suffice to show the strength and serviceableness of the *totora* reeds even when used in slender bundles: "They [the Indians of Peru] make as it were faggots of bul-rushes or drie sedges well bound together, which they call *Balsas*; having carried them upon their shoulders to the sea, they cast them in, and presently leape upon them. Being so set, they lanch out into the deepe, ...they goe a league or two into the sea to fish, carrying with them their cordes and nettes upon these faggots, and beare themselves thereon. They cast out their nettes, and do there remaine fishing the greatest parte of the day and night, untill they have filled up their measure, with the which they returne well satisfied. Truely it was delightfull to see them fish at Callao of Lima, for they were many in number, and every one set on horseback, cutting the waves of the sea, *which in their place of fishing are great and furious*, ..."

These fishermen's reed-bundles were taken apart and dried in the sun when ashore. How long would a reed-ship of some size remain buoyant at sea? The reed-boats at Lake Titicaca to-day are dragged up on to the land from time to time lest they become waterlogged and rot, but occasionally they remain in the water for as long as several months at a time. We also recall that the Incas had built a pontoon bridge of reed-bundles across Rio Desaguadero. The Uru tribes on Lake Titicaca used to live on their reed-rafts. (Friederici 1907, p. 19.) Nor shall we forget that the pre-Incas on the coast, who were such experts in impregnating their mummies with a resinous substance, might also have known how to impregnate their water-craft—if necessary. The idea of waterproofing vessels was not brought to America by Europeans. We have seen how the Northwest Indians covered their large canoes with oil and paint. Stripes of paint are also found on the Arica raft models, and some of the Paracas centre-boards are carefully painted. Lothrop (1932, p. 230) shows that beeswax was used by the Cayapa Indians of Ecuador to coat their canoes. Herrera is quoted by Hornell (1946 a, p. 61) and others as stating that the canoes of the aborigines of the Lesser Antilles had their "sides raised by canes, daubed over with bitumen." The same author writes (*Ibid.*, p. 60): "In Ancient Egypt and in Assyria reed-bundle craft were made water-resistant when this was necessary by a coating of bitumen,..." Hornell argues, on the basis of this last information, that the balsa-wood of the timber rafts in ancient Peru might have been waterproofed in a similar way. This would have been superfluous (Heyerdahl 1950 a, p. 29), but, if necessary, the *reed-vessels* might have been thus coated with bitumen as among other early culture-peoples on both sides of the Atlantic. We have earlier shown with Andagoya how the Peruvian raftsmen on the northern part of their coast had access to a natural spring, forming a little lake, of a rosin like tar, perfectly suited for waterproofing ropes and craft. We do not, therefore, believe that the ingenious high-culture people who built their reed-ships in early coastal Peru needed to make craft that quickly sank beneath their feet.

We may also bear another fact in mind; the stoical Peruvian seamen, who were capable of restoring the decreasing buoyancy of their inflated seal-skin bags by blowing them up while sitting on them at sea, would also be capable of repairing their reed-craft while afloat, by exchanging wet reeds in the bottom layers with a dry supply from above the water level. This would only have to be done at intervals of many weeks, and would seem a simple performance since the bow and stern-pieces, to judge from the prehistoric reproductions, were raised suggestively high above the water. These vertical but very light reed-bundles would, therefore, be kept perfectly dry by the combined action of wind and sun, and would give a skilled crew the full opportunity of manipulating the buoyancy of their craft to a considerable degree over a long period of time.

The same upturned bow and stern-pieces may even give us a clue to the *stability* of these long lost reed vessels: they are shown by the Early Chimu artists with a *double stern*. This, combined with the plain reproduction of a superimposed platform or deck, clearly indicates that we are dealing with some sort of forked or plough-shaped craft, if not directly a *double*-raft like some New Zealand log-rafts and some of the decked reed-rafts of Lake Titicaca used in historical times. Plough-shaped vessels were not quite unfamiliar even in Polynesian boat-construction at the time of European discoveries. Byron (1826, p. 207) describes a canoe "of very singular construction" which he observed in the Hervey Group: "Though double, like the warcanoes of the Sandwich Islands, its form is very different. The prows and waists were two, but the sterns united, so as to form but one, and this stern, curiously carved, was carried up in a curve to the height of six or seven feet above the water's edge."[1]

Some interesting information is most probably also concealed in the balls or discs attached to each end of the craft on page 589, as well as to the pendulum-like object suspended underneath some of these rafts. Certain it is that no coastal "fisherman" was dressed in royal garb like the deities and bird-men on board these reed-boats, nor were they equipped with water-bottles in such quantity as to fill the whole hull of their vessel. A most interesting Early Chimu vase, ornamented with a quite analogous reed-ship, was also recently shown to me by Dr. Braunholtz of the British Museum, who gave much speculation to the surprising nature of the early reed-craft depicted, as it too clearly was fitted with a superimposed deck.

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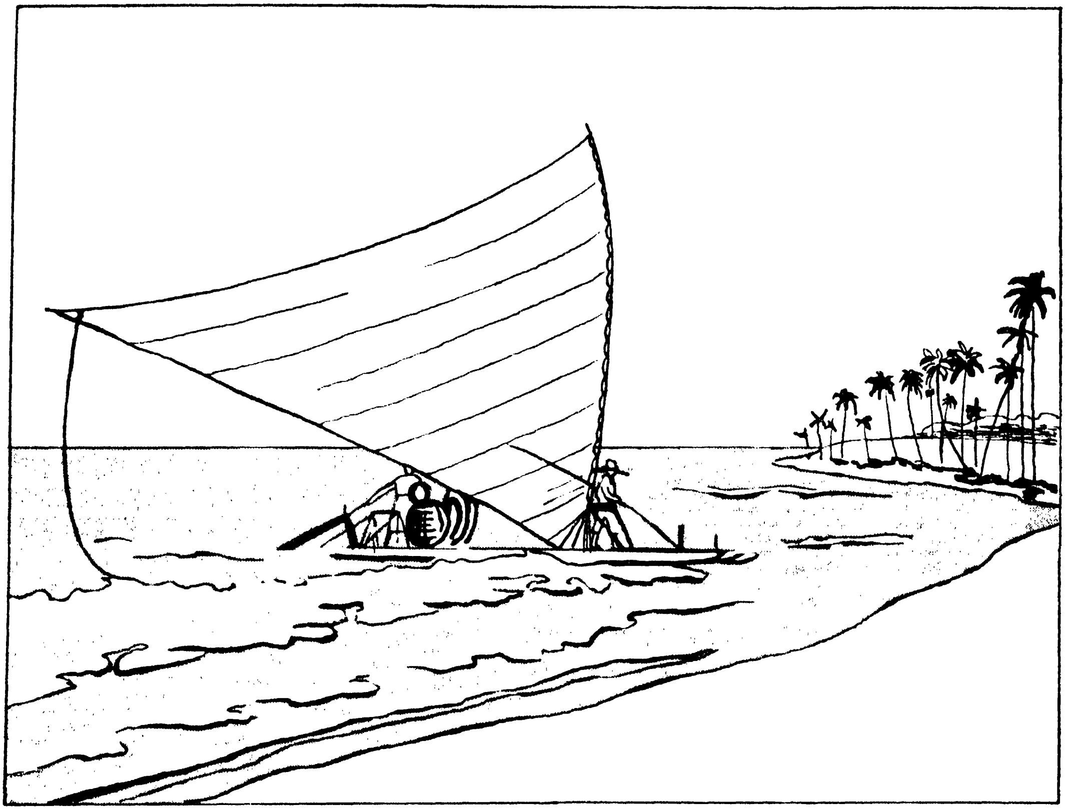
[1] The same author also speaks of the deity Rono for whom Captain Cook was mistaken in Hawaii, stating that the last which is recalled of him is that "he embarked in a triangular boat (*piama lau*), and sailed to a foreign land."

While the coastal merchants' sail, as first seen by Ruiz and verified by the other chroniclers, was made of cotton canvas and was cut and used in the same manner as on the Spanish caravels, the poor fishermen of Lake Titicaca made their clumsy sails of bulrushes as did some of the early Maoris (p. 99 above), and the pre-ceramic people of Arica. Although the chroniclers have left very little information as to the shape of the sails in early Peru, available evidence indicates that it was commonly square, rectangular, or, as so often seen on Lake Titicaca, trapezoidal. However, Spilbergen's drawing published in 1619 shows triangular sails in use, such are later also described on balsa rafts by Skogman (1854, Vol. I, p. 164), and triangular sails are indeed characteristic of the balsa rafts used with centre-boards by the aborigines of Brazil. (Hornell 1946 b, p. 82.) How ancient this type of sail is on the Brazilian rafts we have no means of ascertaining, but recent illustrations of *jangada* (balsa-raft) sails in Brazil show strong similarities to the upturned triangular sail of parts of Polynesia (and modern Bali).

Best (1925 a, p. 142) seems to believe the original Peruvian sail to have been triangular, and on this assumption he draws a parallel with Polynesia; Nordenskiöld (1933, p. 265) lists both triangular and square sails in aboriginal South America, and both Friederici (1915) and Imbelloni (1926 a p. 34) speak of similarities between Polynesian and Peruvian sails. But, as stressed by Emory (1942 b, p. 132), we shall need far more data on the shape of the aboriginal South American sails before we can compare them with the wide variety of sail types in Oceania. It would, in fact, seem most probable that the change of sailing craft from the sturdy, slow raft of the early era with its centre-boards, bipod mast and associate rigging, to the slender war canoe of historic Polynesia—combined with access to the Melanesian type of outrigger and the Melanesian type of arrow-head and triangular canoe-sails—would bring about new ideas and improvements, and change the former raft-sails completely.

Best (1925 a, p. 255) quotes Stokes, who briefly sums up the prevailing sail forms west of Polynesia: "Chinese and Japanese sails were trapezoidal and square sails; those of Formosa and the Liu Kiu Islands resemble Chinese sails, as also did those of the Philippines. The sails of the Malayan Archipelago are rectangular or rhomboidal; these are found as far eastward as New Guinea, though modified in various places. Eastward of New Guinea another form appears. 'The shape of this,' says Mr. Stokes, 'may be said to have resembled an attenuated arrow-head with the haft removed and the tips of the thin barbs contracted. ... The shape of this sail held with little variation among the islands to the eastward almost as far as Fiji, and then became merged into the triangular sail of the Fijians.' " Best shows that east of Fiji the triangular form, with often strong inter-island varieties, prevails.

As the outrigger reached the Maori-Polynesian canoes from Melanesia, so also the half-moon and triangular sails of Polynesia were probably improvements based on ideas



The *jangada* or sailing raft of Brazil.

borrowed from the same island neighbours. The aboriginal Peruvian sail, designed and suited for use on large and heavy balsa rafts, could with obvious advantage be replaced by the Melanesian ideas of sailing gear the moment canoe-builders replaced raftsmen in the East Pacific.

Even without foreign inspiration from Northwest Indian and Melanesian canoe-builders, South American mariners would be forced to modify their former ideas of boat-building the moment they settled on the islands in Polynesia. In the first place, neither the exceedingly buoyant balsa tree nor the handy and water resistant *totora* reeds were common on the islands, and the traditional building materials for rafts would therefore have to be replaced by inferior substitutes. In Chile, the average Indian could not afford to import balsa timbers from the far north, and log-rafts were there constructed of willow and other light woods, and where suitable trees of any description were lacking, the same rafts were made from the cores of giant cacti. (Lothrop 1932, p. 238.) So in Polynesia there were many species of very light wood suitable for making good log-rafts, but none so perfectly suited to the purpose as the balsa wood.[1] Therefore, with the introduction of a new population with good sea-going canoes, it was but natural that the ordinary heavy log-rafts formerly in use should fail to make much impression. A plain log-raft would be even less likely to survive the change of culture and culture bearers than would the somewhat more ingenious reed-bundle type of wash-through craft. Therefore, while the reed-bundle rafts remained remarkably widespread in Polynesia, the plain log-raft survived *fully* as main water-craft only in one of the groups, namely Mangareva. The sail depicted by Beechey on the Mangareva raft was made in a style common in Polynesia at the time of European discoveries, but we are not told that centre-boards were used. Yet it is difficult to see how the Mangareva rafts could sail to Rapa-iti or Rarotonga and back without vertical boards of any sort between the logs, as they would otherwise give complete leeway and drift exactly as the wind blew. The climate of Polynesia does not permit of the archæological preservation of centre-boards as does that of the desert coast of Peru; and if unornamented, as they were in most parts of Pacific South America, such removable boards would be very likely to escape notice both ashore and at sea.

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[1] The balsa-tree (*Ochroma lagopus Sw.*) is a native of South and Central America with the West Indies. In Polynesia the tree occurs in the Marquesas Group. It is thought to have been introduced there by European ships, but when, and for what purpose, is not known. (F. B. H. Brown 1935, p. 179.)

No other island in historic Polynesia retained craft so constructed as to allow centre-boards to survive in use until the arrival of European observers. In some of the groups further west, where rafts had been abandoned and centre-boards therefore were of no avail, paddle-handles were carved with an elaborate traditional design of human figures standing in a row and clasping hands with elbows bent, precisely as so frequently found on archæological centre-boards from Peru. (See Plate LXXVIII.) The possibility of the survival of a navigational ornament in spite of the loss of a superfluous navigational mechanism does here seem to loom large.

Outside America the centre-board seems to have been historically observed in aboriginal navigation only on the three-men bamboo rafts of Formosa. Its antiquity there is apparently not verified. It may or may not be a coincidence, but Formosa is located in the same dead-lock corner of the Pacific, between the Mariannas, South China and the Philippines, where the North Equatorial Current turns north after its broad sweep westwards from Central America. Whether we are dealing with aboriginal or post-European diffusion, or with independent invention, is a question not yet settled. Hornell (1931, 1946 b) and Lothrop (1932) both take up the subject, but seem to reach contrary conclusions. Lothrop holds the rather reasonable opinion that the South American raft and its navigation system did not arrive oversea by way of Formosa, but are locally developed American culture elements. His opinion seems to be that the balsa raft developed from a river vessel in the highland or jungle areas of interior South America, for he writes (*Ibid.*, p. 253): "Rafts with raised platforms, often carrying small shelters, are widely employed across the Andes, so that it seems safe to assume that the *jangada* originated in the interior. In actual practice, however, the *jangada* was much the most seaworthy and capable vessel produced in the New World. It was able to carry a large cargo and to house its crew in comfort, and, at the same time, the invention of sails and centre-boards made it possible to propel and manæuvre with ease in the open ocean an otherwise clumsy raft." At the same time he writes (*Ibid.*, p. 237): "From the foregoing description it will be seen that the *jangada* was steered in a manner found in no other part of the world, except it be Formosa, from which island come models of large sailing rafts with centreboard fittings, apparently homologous. Were it not for this exception the invention of the centreboard might be attributed to the natives of

South America. While leeboards have been known for many centuries, the centreboard has been employed in Europe and North America only since about 1870."

Hornell (1931, p. 355; 1946 b, p. 81), who first pointed to the analogies between the South American and Formosan sailing-rafts, also seems to take it for granted that the use of centre-boards was prehistoric in Formosa. He says (1946 b, p. 82) with reference to Europe: "...the nineteenth century invention of the centreboard or drop keel was anticipated both in Formosa and South America by centuries and put to greater and more extensive and varied use." But in his paper on "South American Balsas; The Problem of their Origin", the same author (1931, p. 353) shows that nowhere in the world are there more similarities in 'balsa' types, and greater possibility of relationship, than in Polynesia and Peru. This observation leads him to believe, contrary to Lothrop, that the South American raft-forms represent a culture element imported from the islands in the Pacific. Overlooking the possibility that the spread might have gone down-wind *from* Peru, Hornell strives to bring the balsa-type rafts from Formosa and Polynesia up-wind *to* Peru. As a practical expert on aboriginal Pacific craft and currents, Hornell admits the practical obstacles to his own migration theory, and is forced to resort to a round-about coastal route from Oceania and/or Formosa to the Aleutians and thence down the entire New World coast to Pacific South America. He writes (1931, p. 355): "In view of the distance between the eastern islands of Polynesia and the coast of America and of the adverse westerly run and great strength of the current which a canoe would have to meet on the passage eastwards, the probabilities are apparently in favour of coastwise diffusion from Asia in very remote times, rather than by the ocean highway."

This view was opposed by Means (1942, p. 20), who held: "...we should note in passing that Mr. James Hornell, in seeking to trace the origin of *balsas*, ...concludes that the *balsa* was brought into western South America from eastern Asia by means of coastwise diffusion by way of the Aleutian Islands, Alaska, and the west coast of America. This thesis of a coastwise diffusion of the *balsa* type of craft from eastern Asia and/or Oceania into western South America is vitiated by the fact that the *balsa* type appears along the indicated route only at the extremities thereof, absolutely no traces of it appearing in the immense intervening stretches of the American west coast." Lewis (1947, p. 13) admits that an "indication of contact between the two sides of the South Pacific comes from the work of J. Hornell, who made an exhaustive study of the sailing craft of Oceania and also of the South American sailing balsas," but Lewis too supports Means' argument that the long *coastal* route between shows no vestiges of a former use of such wash-through craft.

The fact that the reed-bundle and other balsa-like craft of America have a marked Middle-American centre of distribution, with a northern limit in Lower California, would strongly support Lothrop's view that this peculiar ocean vessel must have begun its evolution within the tropical belt of the Americas. But there is a possible alternative to Lothrop's proposal of local origins, which is not eliminated by the reasoning above set forth. The idea, if not the craft itself in one of its manifestations, might have reached tropical America like the gourd and cotton domestication, with a favourable wind and current from the African side of the Atlantic. Neither this alternative nor the one of local American evolution should be rejected without good reason. From a maritime point of view we seem to have none. Some of the leading civilizations in ancient Egypt and the Near East made use of reed-bundle boats and sea-going sail-rafts. (Halldin 1950, p. 68; etc.)

The balsa raft as a stumbling-block in modern anthropology

More than hundred years ago attention was focused on the question whether or not the South American aborigines possessed seaworthy craft by which they could have contributed to the aboriginal peopling of Polynesia down-wind from their own coast. The idea had been ventilated, as seen earlier, by Zuñiga in 1803 and by Ellis in 1829, but Lang (1834), in his *View of the Origin and Migrations of the Polynesian Nation*, argued that on the west coast of South America there were no mariners, and aboriginal Americans could not therefore have reached Polynesia. A weatherdriven canoe from Easter Island, he said, would reach South America in a couple of weeks or so, but not one in a thousand would ever reach Polynesia from South America! In a paper called "The Polynesian Migrations" Garnier (1870, p. 38) strongly opposes this view, holding that Lang's argument was based on wrong information and was disproved by the narratives of the early voyagers, who had seen along the coast of Peru rafts capable of mastering the open sea.

Wilson (1862, p. 361) also studied the early chroniclers when writing his *Prehistoric Man*, and he too had his own ideas as to how Polynesia could first have been discovered. Speaking of Ruiz' meeting with the first balsa raft, he wrote: "The balsa's crew included both men and women, who carried with them provisions for their voyage, and had come from a Peruvian port some degrees to the south. Like older voyagers of the Mediterranean, the Peruvian pilots were wont to creep timidly along the shore; but the Spaniards encountered them in the open Pacific, where no European prow had ever sailed. Caught by a sudden gale their bark might have been borne far off among the islands that stud the Southern Ocean, and here was the germ of a race of islanders, to whom, after a few generations, the memory of their Peruvian ancestry would have survived only as some mythic legend, like the Manco Capac of their own Incas, or the Mawai [Maui] of the Polynesian archipelago."

In a paper on the "Anthropology of Prehistoric Peru", Hutchinson (1875, pp. 426, 454) ridicules the possibility that a South American balsa raft can carry people in the open ocean—a negative attitude which in after years should penetrate the anthropological literature. The author contemptibly referred to the balsa-log raft as a "floating bundle of corkwood", basing his view, as he claims, on personal observation of the vessel, as he was himself set ashore in Peru from a steamer by means of such a raft. He writes: "Professor Wilson thinks it was by means of these vessels, driven off the coast of America westward, that the Polynesian and Malay islands were peopled ..." Scoffing at this mere idea, as well as the opinion of Fox that "the perfection of raft navigation is on the coast of Peru," Hutchinson writes: "Even the old pilot, Bartholomew Ruiz, commended by some of the Inca believers as the model of truth, describes one of the *Balsas* he met out at sea in connection with gold. This is a Peruvian craft, formed of huge timbers of light, porous wood, and with a flooring of reeds raised above them. Two masts sustained the large, square, cotton sail, and a moveable keel and rudder enabled the boatman to steer. Exactly the style of float that I went ashore upon to San José, the port of Lambayeque, about eighteen months ago, from the steamer Quito, and the most unlikely craft to have even a suspicion of gold on board. ... The idea of balances to weigh gold on board of a little craft, in such a rough sea as is generally in the northern Pacific, borders somewhat on the farcical."

As the timbered balsa rafts disappeared from the twentieth century Peru, even their former existence was overlooked by great many students of Pacific ethnology. Thus, already in 1914, in a paper on Easter Island, Knoche (1914, p. 2) firmly rejects the possibility that impulses could have reached Polynesia from aboriginal South America. He argues: "Due to the scarcity of harbours there was no navigation on the west coast of South America, other than the sparse coastal traffic in small reed-balsas, wherefore the ideas of those phantasts who try to propose Easter Island as an important link of contact between the two areas dissolve to nothing."

A quarter of a century before Hutchinson on face value criticized and minimized the qualities of the gradually disappearing balsa raft, another event had taken place that was perhaps to have even more direct consequences on Pacific anthropology in the years to come. In a book of his experiences on a journey through western South America, Byam (1850, p. 200) describes a voyage by sailing ship up the coast of North Peru: "Cape Blanco was on our starboard bow, about two or three miles off. ... The fresh breezewas a fair as it could blow, and was sending us along at the rate of more than ten knots an hour, with almost a smooth sea." The vessel on board which Byam was a passenger was thus northbound when the author suddenly discovered a peculiar sailing vessel coming against them heading south. "I have seen," he says, "lots of other craft in many parts of the world, but I never saw such a sail or hull as that." Asking the captain of his own ship what this might be, he received the following reply. " 'Why, that,' the captain replied, 'is nothing more than a raft of Bolsa-wood, out of the Guayaquil river. When I came down this coast first, I was as much puzzled as you are now.'

" 'But,' I exclaimed, 'look at the sail; it is full of holes and rents, and yet seems to stand like a board!'

" 'Ay!' the skipper replied, 'it is a merciful blessing she can't keep all the wind to herself; but it is impossible to see sails set flatter than those rags. See! she has just caught the stiff breeze off Cape Blanco, and has hauled close to the wind; she is bound to Payta, or some other small port close by.'

" 'But what a curious hull,' I said, 'for the sea washes clean over it.'

" 'Ay!' went on the captain, 'I have certainly seen nicerlooking craft turned out of Baltmore; but that hull that you are looking at is nothing more than a raft and *that's a fact!* It is made of Bolsa-wood, and I make my razor-strops of the same stuff.'... 'Now,' continued my friend, 'the people lash these logs together lengthways, leaving the centre one of the longest, as a stem, and others shorter on each side, for the bows of their vessel. They then cross and recross the wood, until the middle is high enough above water to keep their provisions dry and their water fresh; but the steersman aft is literally up to his knees in water. They stick a pole in the centre, as a mast to hoist that sail upon; and a few planks are thrust straight down, to serve as a keel to make the craft hold her wind; and as, whenever they have to go to the south of Guayaquil, the wind is almost always contrary, they have to work, tack and tack, to windward. After their return to Guayaquil, they unlash their rafts, and leave the wood on the shore to dry, as it is so porous that in a few weeks it absorbs so much water as to lose much of its buoyancy. I saw once one of these rafts close to a whale-boat under sail on a wind; and although the boat went faster through the water, it made much more lee-way than the raft did."

When Lothrop in 1932 compiled material for his otherwise excellent study on "Aboriginal Navigation off the West Coast of South America," he was misled by Byam's indirect information. Referring to him as his source, Lothrop (1932, p. 238) claims that the balsa raft can only be used as a coastal craft, "because balsa wood, while extremely buoyant, nevertheless absorbs water rapidly and loses its buoyancy completely after a few weeks. Owing to this characteristic it was necessary to take the *jangada* apart at intervals, haul the logs ashore, and there allow them to dry out thoroughly." As we have already seen, Lothrop finds that a coastal raft, thus dependent on being regularly dried out ashore, cannot remain at sea long enough to reach any distant Pacific islands, not even the Galapagos, a few hundred miles off shore.

Few Americanists after Lothrop have cared to penetrate further into the study of balsa rafts, and his judgement of the available evidence on the subject has been gradually accepted as conclusive. Some additional material is brought up by Means (1942) in his interesting paper "Pre-Spanish Navigation Off the Andean Coast", but, referring in part to Lothrop, Means accepts the same negative view in his theoretical judgement of the quality of the balsa raft. He says (*Ibid.*, p. 19): "The ineptitude of the Andean seaboard dwellers in marine matters is difficult to explain. Their long coastline had a sufficiency of ports and it should have made them expert upon the ocean from which they derived so great a portion of their food. Moreover, at least in the northern part of the Andean coast, wood capable of being used for the building of really good boats was plentiful. Yet the Andeans never developed vessels worthy to be compared with the best types of craft made by sundry Oceanic and Oriental folk who, in terms of general culture, were more or less their equals. Why? ... The highest native American cultures, being shut off from the other high cultures of the world and also from one another and from other and less advanced American cultures, simply never had a good initial stimulus towards boat building, and so they never made any noteworthy progress in that field of endeavor. This, unsatisfactory though it be, is the only explanation I can think of for the lack of marine expertness which the otherwise advanced Andeans displayed in pre-Spanish times."[1]

Means, as earlier shown, is fully aware of the extensive use of balsa rafts in prehistoric Peru; he only fails to appreciate its true qualities. He believes Tupac Inca's balsa raft fleet to have discovered Galapagos, and says of Ruiz' capture of the first historic balsa raft (*Ibid.*, p. 18): "Thus he learned that the *balsa* had come out of Tumbez and that it was proceeding up the coast on a trading journey. The descriptions of this *balsa*, of its rig, of its deck-house, of its passengers, and of its cargo given by various Spanish writers within a few years of the incident make it clear enough that the *balsa* was of the most elaborate type known. Moreover, the fact that it was going northwards from Tumbez on a trading journey implies that such enterprises were usual. ... Altogether, we are justified in concluding that, in Peruvian native navigation prior to the Spanish conquest, the *balsa*-log raft, with sails, deck-house, and cargo-space, was the least contemptible and the least inefficient type of craft known. This, admittedly, is faint praise; but, in view of the facts, it is the best that can be given to the boat-building art of those singularly unmarine-minded people, the ancient Andeans." Referring to Humboldt's raft drawing (here reproduced in Plate XXXIII **2**) Means (*Ibid.*, p. 15) says: "This sort of raft, which is still in general use on the Guayas River, was undoubtedly the very best kind of ship known to the pre-Spanish Andean navigators. At that, it was obviously a type of boat that would awake nothing but scorn in the breasts of shipbuilders of almost any other maritime people in the world."

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[1] Means (*Ibid.*) refers to the waterproof craft of Alaska and of the Northwest Coast as "admirable boats".

Since this judgement was made by one of the most prominent and qualified authorities on early Peruvian history, it is easy to understand that general anthropologists with far less knowledge of the history and culture of aboriginal Peru accepted the erroneous dogma that marine architecture on the west coast of South America was inferior to that of almost any other ancient culture-people in the world.

This confident attitude among the Americanists was bound to have an effect upon Polynesian research. Among contemporary Pacific scholars Dixon was the first prominent authority to be misled into gradually introducing the false doctrine into Polynesian literature. In 1928 he wrote (p. 204): "Indeed, on the whole Peruvian coast, ...only raft-like balsas of logs or canes were known and used in considerable coastwise trade." In 1932 he succeeded in proving that the sweet-potato had been carried from Peru to Polynesia in prehistoric time, and therefore either by Polynesian canoes or by Peruvian rafts. He does not yet reject the latter possibility, as he shows (1932, p. 59) as an open alternative that the presence of the Peruvian culture plant with its Peruvian name in Polynesia may be due to "Peruvian or other American Indians who sailed westward and carried the sweet potato with them to Polynesia thousands of miles away." In the same year Lothrop (1932) presented his special survey of Peruvian navigation, and arrived at the negative result that balsa rafts could not have reached any islands in the open Pacific. After this, as we have earlier seen, Dixon (1934, p. 173) came back and wrote a new publication entitled "The long voyages of the Polynesians", in which he affirms: "...since we have no evidence that at any time the Indians of the Pacific Coast of South America where the sweet potato was grown, had either the craft or the skill for making long sea journeys, we are forced to conclude that the transference of the plant was carried out by Polynesians."

A few years later another Polynesian authority, Buck (1938 a, p. 313), took up the same question in his much cited book *Vikings of the Sunrise.* He quotes Dixon as his source for the important information that there were neither sea-going craft nor maritime skill on the Pacific coast of South America which would enable local aborigines to reach distant islands, and on this foundation he builds up his much quoted claim that some unidentified and forgotten travelling party from the Marquesas Group must have paid a visit to the unmaritime coastal agriculturists of aboriginal Peru, fetching the sweet-potato and donating the gourd.

Publishing later *An Introduction to Polynesian Anthropology*, Buck (1945, p. 11) no longer quotes Dixon, but simply states: "Since the South American Indians had neither the vessels nor the navigating ability to cross the ocean space between their shores and the nearest Polynesian islands, they may be disregarded as the agents of supply."[1]

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[1] Here again the author writes: "If the present theory of botanical authorities is correct, the only solution left is that some Polynesian navigator actually reached South America on a westerly gale, which took him farther than he anticipated. Not liking the country, he returned to Polynesia on the trade winds..."

We have seen in an earlier part how another prominent Polynesian authority, Emory, the leading archæologist in the field of Polynesia, was biassed in his local survey by wrong information about the qualities of the Peruvian balsa rafts. Immediately *before* these false views had penetrated the technical literature of Polynesia, Emory (1933, p. 48) wrote on some of the ancient masonry of Easter Island, the Society Islands, the Marquesas, Hawaii, the Tubuai and the Tonga groups: "...it is quite within reason to entertain an American origin for a cultural element so specialized as this stone facing. It is a conspicuous element localized in the part of America nearest to Polynesia, a part where currents strike out and flow in the direction of Easter Island and the Tuamotus. ... May not one of the sea-going rafts of the early Incas have been swept into this current carrying survivors as far as Easter Island 2 000 miles to the west?"

Later the same author was led to abandon this trend of thought. He writes (1942 b, p. 129): "It has seemed to me barely possible that some Indian or Indians drifted from Peru or Colombia into Polynesia with a provision of sweet potatos. Currents and winds are favourable for this. Against this, as Dixon pointed out to me once in correspondence, is the fact that the *balsa* craft of the west coast of South America quickly became water-logged."

From now on even Emory was led to spread this dogma. When Morgan (1946, p. 80) wanted to know whether a trans-Pacific voyage starting in Peru was feasible in prehistoric time, he came to the conclusion: "The ancient Peruvians were not entirely a land-locked people. They constructed large sea-going rafts—balsas—made of seven to eleven or more water-resistant balsawood logs, which are lighter than cork, ..." He was told by Mr. W. T. Cox and Mr. C. Walker that at least some balsa wood would float for years, but adds: "As on other points, the writer found great differences of opinion concerning the seagoing quality of balsa rafts. Kenneth P. Emory, of the Bishop Museum in Honolulu, wrote definitely, 'Balsa rafts become waterlogged in a few days if not taken out of the water to dry.' Later he wrote that he received this information from the late Roland B. Dixon, and added, 'Dixon was so emphatic about it being true that he caused me to modify my opinion that Peruvians may have reached Easter Island bringing the sweet potato and the masonry technique of cutting jogs in stones to make them fit together.' " (Letters to the author, February 3, 1941, and February 22, 1944.)

Probably the same sources caused Weckler (1943, p. 35) to state in his *Polynesian Explorers of the Pacific* that "no American Indians had sea-going ships that were capable of such passages as the voyage to Polynesia."

This belief had such a firm grip on the mind of anthropologists that it was used as a final argument in any discussion where the hypothesis of Peruvian voyages to aboriginal Polynesia was brought up. In 1945 and 1946 Hornell tried to modify this view. As a leading authority on Pacific water-craft he contributed two rather homologous papers, "Was there a pre-Columbian contact between the peoples of Oceania and S. America?" and "How did the Sweet Potato reach Oceania?" In these contributions he attempts to demonstrate and defend the diffusion possibilities caused by the presence of balsa rafts in aboriginal Peru, whereas he argues strongly against the theory of canoes from the Marquesas Islands having been blown by a gale to Peru and returned to their own islands because the voyagers did not like the country. He says (1946 a, p. 59): "this route may be eliminated at once because the drift of the South Equatorial and Peru Currents would be contrary over the entire distance to be traversed; the length of the voyage would also be considerably greater than that by Easter Island. The winds also would usually be adverse."

Opposing the authorities who dismiss the sea-going possibilities of the Peruvian balsa raft, Hornell (*Ibid.*, p. 52) maintains: "In vessels of this kind, provided the logs do not become sodden and waterlogged, quite lengthy voyages are feasible, even to the islands of Polynesia. Ample supplies of food and water could be carried comfortably, sufficient for a prolonged period; the set of the Peruvian current was certainly known and Peruvian sailors probably had some knowledge of the alteration in its course towards the north-west as it approaches nearer to the equator. With this factor in their favour, it amounts almost to a certainty that their vessel, if dismasted in a storm, would be carried eventually to the immediate neighbourhood of the Marquesas Islands." Further (*Ibid.*, p. 54): "Omitting as improbable the possibility that Incan sailors ever voyaged westwards with the specific object of finding land except on the one historic occasion already mentioned [Tupac Inca's expedition], there remains the question of whether unpremediated or involuntary voyages may have been made towards the Polynesian Islands by some of their great sailing balsas when dismasted and rendered unmanageable by an easterly or south-easterly gale. If carried towards the west or north-west by the storm, the forlorn craft would come under the influence of the South Equatorial Drift; thenceforward it would progress gradually towards the Marquesas Islands; if it missed going ashore there, the craft would drift on through the Paumotus [Tuamotus] to the Society Islands, provided that the Paumotus were passed without final disaster."

Through a very logical presentation of available geographical and anthropological information, the same author (*Ibid.*, p. 57) strives to show "... how possible it was during the centuries of Inca domination in the north-west of South America, for the Peruvian sea-going balsas, if coated with some form of waterproofing, to be drifted, when dismasted in a storm, to one or other of the eastern Polynesian islands and with the crew alive, if there were aboard a good supply of fresh water and a sufficiency of food. The ordinary provisions carried would comprise usually a quantity of edible roots and tubers, such as those of the sweet-potato; there would often be a supply of various fruits containing seeds from which new plants could be raised. Sometimes part or even the whole of the cargo might have been made up of such vegetable products. So long as food and water lasted, a prolonged voyage aboard a balsa, even if crippled by a gale, would be easily bearable by the stoic Indians of Peru; if they eventually struck an island in the Marquesas or in the Paumotus, and if they escaped death at the hands of the natives, we may be sure that they would indicate the food value of the tubers and roots and fruits that remained uneaten. ... This probability would be greatly increased if any women were taken aboard when sailing from Peru. As already noted it is likely that women would be spared, even if all the men were killed."

If we assume, as at present, that the islands were uninhabited at the time they were discovered from aboriginal Peru, then even this problem of a hostile reception would be eliminated.

Hornell, in spite of his defence of the craft under consideration, also refers to the belief that balsa rafts "remain buoyant for a very limited time when immersed in water" (*Ibid.*,

p. 50), and he modifies his praise with one specific reservation: "Certainly no ordinary, untreated balsa raft could make a prolonged oversea voyage unless the Inca's seamen knew of an effective method of treating its absorbent logs with some kind of waterproofing composition as already suggested." (*Ibid.*, p. 54.)

The Kon-Tiki Expedition

Observations during a year of field research among the aborigines and the prehistoric stone remains of the Marquesas Islands (1937-38), caused the present author to put forward the hypothesis that America rather than Asia had contributed to the direct settling of Polynesia, and that the original island discoverers had come by rafts drifting directly into the island world with the trade wind and the rapid ocean current from Peru. (Heyerdahl 1941 b, p. 20.) The manuscript of a monograph in defence of this view failed to attract any attention among anthropologists and publishers when presented for publication in 1939, and the same thing happened when the material was rewritten and presented in extended form in 1946. (M. S.: *Polynesia and America. A Study of Prehistoric Relations.*)[1] In discussions on the subject with some of the leading contemporary Americanists, the author was confronted with the usual argument that a voyage from Peru to Polynesia was simply not feasible with the inadequate water-craft possessed by the aborigines of pre-Columbian Peru.[2] Thus there was, after seven years' attempt, still no possibility of creating interest in, or even getting attention paid to, a theory of aboriginal American voyages to Polynesia.

I then realized that unless this dogma could be disproved, and unless something rather drastic was done to force attention to the subject, any further nursing of the theory of aboriginal emigration from America would have to be dropped on account of the general lack of response. Therefore I decided to build a replica of the much disputed balsa raft for a double purpose: to ascertain its behaviour and qualities at sea by practical observation, and to show the correctness of what I felt could be indirectly deduced from other facts—

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[1] Repeated newspaper criticisms have emanated from certain Scandinavian scientists who are not aware of the difficulties I encountered in these early attempts, and therefore protest against my publication of the narrative travel book *The Kon-Tiki Expedition*, intended for the general public, before I had published a scientific report on the Peru-Polynesian migration theory. However, having failed to find in 1939 a publisher for my work *Polynesia and America, A Study of Prehistoric Relations*, I succeeded in publishing in 1941 a much abridged paper "Did Polynesian Culture Originate in America?", in which all the essential claims and conclusions of the present work are outlined. Attempting to create interest in my unpublished manuscript, I wrote (1941 b, p. 18): "I believe to possess sufficient material to trace two separate migrations from the American mainland into the Polynesian island-world. (1) A pre-Incan civilization, with its centre near Lake Titicaca and along the Peruvian coast below, seems to have swept the islands at a comparatively early period, via Easter Island; while (2) a later immigration, the descendants of which dominate the present Polynesian race, reached the islands via Hawaii from the Bella Coola area of British Columbia about 1000 A. D. I will... to an extent compatible with the limited space allotted to this article, try to indicate the main foundations for this theory. ..." etc.

[2] An outstanding authority on aboriginal American high-cultures, Dr. H. J. Spinden, for whose help and valuable advice I am most obliged, was quite emphatic as to the correctness of the current opinon that the shallow and open Peruvian balsa raft would be useless for a voyage to Polynesia. Another prominent scholar, Dr. R. Linton, who maintained the same view, has later gone even further (*Aftenposten*, Oslo, October 3, 1949), proposing that *balsa-log* rafts were not known in pre-Spanish times west of the Andes, and defending the view that there were no aboriginal navigators on the west coast of South America before the time of Pizarro.

that Polynesia was well within the natural range of the aboriginal Peruvian craft. Being quite unfamiliar with balsa wood, balsa rafts, and any form of sail-sport, my conclusions were based wholly on the observation that certain culture plants had been brought across the sea from Peru to Polynesia in prehistoric time together with a conspicuous series of man-made American culture elements and traditions. (See Parts VI, VII, IX, and X.) From this observation it could be deduced that any Peruvian culture-people capable of bringing early colonists ashore in Polynesia must have had a water-craft with adequate sea-going abilities. The traditional water-craft on the ocean alongside Peru was the balsa raft, and I therefore deduced that in this apparently primitive invention the early Peruvian high-cultures must have had a vessel capable of ocean travel. This indeed, was also independently verified by the statements of the early Spaniards, who declared unlike modern writers, that the Peruvians were *great mariners* and that the balsa raft was their favourite ocean craft. To my mind, an early expert navigator and keen observer like Sarmiento de Gamboa would never have gone far into the Pacific in search of islands said to have been visited by Peruvian balsa rafts, had his own eyewitness impression of these rafts concurred with the opinion prevailing among writers in modern times, who were handicapped by judging these lost craft entirely on a theoretical basis. Confident of finding good qualities to the main water-craft of the competent high-culture people of Peru, I was also led by geographical facts to assume that any sea-bound Peruvian raft would necessarily be urged directly towards Polynesia both by wind and current.

Through the generous cooperation of the Government of Peru, a replica of the ancient balsa raft was built in the naval yard at Callao, with the aid of Herman Watzinger, Knut Haugland, Torstein Raaby, Erik Hesselberg and Bengt Danielsson, all of whom were later to be my companions on the raft voyage across the sea.

The raft was built on the general principles recorded in the early European eyewitnesses reports (see p. 515 above), and Watzinger, who was in charge of the construction, collected whatever evidence was still obtainable from old people in various parts of the Guayaquil region of Ecuador and further down along the desert coast of Peru, especially at Talara, south of Cape Blanco.[1]

The raft *Kon-Tiki*, named after the emigrant Peruvian culture hero described in Part V, was constructed of nine main balsa logs from the jungle of Ecuador. As on the pre-Inca models from Arica, the logs were pointed at the bow, and deep grooves were cut round them to prevent the lashings from slipping. These nine logs were first laid loose side by side in the water, so that they might all fall freely into their natural floating position before being lashed securely together by ropes. The longest log, 45 ft. long, was laid in the middle and projected at both ends between the other logs, all of which were gradually shorter and shorter on both sides, until the outer logs forming the sides of the raft were 30 ft. long.

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[1] Recently Watzinger also visited Sechura, south of Paita, Peru, in which port he learnt that European fishing boats had been in general use locally only since 1900. About the same year a considerable number of local families still went out ocean fishing on board 50 large balsa rafts, each manned by a crew of 6 to 10. These rafts were about 40 feet long and 20 feet wide, composed of up to 15 balsa logs, across and above which were lashed up to 8 other balsa logs. The deck carried two small huts, one 12 by 12 feet for provisions, and the other 15 by 15 feet for the crew. The bipod mast was up to 50 feet high, with a boom 35 feet long carrying a square cotton sail of about 600 square feet (60 m^2). Twelve centre-boards were used, between 6 and 8 feet in length. (Letter to the author, August 22, 1950.)

The bow stuck out like a blunt plough, but astern the raft was cut off straight across, except that the three middle logs projected somewhat and supported a short, very thick block of balsa wood which lay athwart ship and held mangrove-wood thole-pins for the 19 ft. long large-bladed mangrove steering-oar. When the nine balsa logs were lashed together, the raft was 18 ft. wide. Nine thinner (1 ft.) balsa logs were lashed on crosswise over them at intervals of about three feet. The raft itself was now complete, fastened together with only short lengths of inch and a quarter-inch hemp rope, each firmly knotted. There were no spikes, nails or wire ropes used in the whole construction, nor were any materials carried on board for repair other than rope, *bejuco*-lianas, and bamboo. A deck of split bamboo covered by reed-mats formed a level platform over most of the partly submerged and exceedingly slippery balsa logs; and in the middle, but nearer to the stern, was erected an 8 by 14 ft. open bamboo hut, formed of heavy bamboo canes covered by plaited reed walls and a roof of bamboo, thatched with banana leaves. The heavy 29 ft. bipod mast of mangrove wood was raised forward of the cabin, and the 15 by 18 ft. square-sail of cotton canvas was hauled upon a yard made of two bamboo stems bound together to secure double strength. We inserted five 6 ft. centre-boards, scattered about at irregular places and without system, into some of the large chinks between the undressed logs. On own accord we lashed on with rope some quite low splash-boards at the bow, above the surface of the water, but experience proved these to be not merely superfluous but useless, as the swells and seas always outdistanced the raft and splashed over the logs astern, where they quickly fell through and back into the sea. No rail or other protection was placed round the raft, except a long slender balsa log which afforded foothold along each side. The 45 ft. raft was well within the average of the aboriginal balsa rafts described above, and considerably smaller than the largest 70 to 80 ft. specimens from ancient Paita, Tumbez and Guayaquil.

On April 28, 1947, the raft was towed out of Callao naval harbour and set adrift clear of the coastal traffic in the early Indian fishing-grounds on the inner edge of the Humboldt Current. On August 7 the raft was washed ashore on the reef of Raroia atoll in the Tuamotu Archipelago, with the crew and all the main cargo safe. (Heyerdahl 1948 b.) The discoveries of the expedition with a bearing on the problem under discussion may be summarized as follows:

1. Polynesia was well within the range of coastal craft in aboriginal Peru.

2. Weather-driven balsa rafts trapped in the Peru Current will automatically convey crew and cargo from South America to Polynesia, and food and water may be replenished in the course of the transfer.

3. The South American balsa raft was capacious, commodious, exceedingly seaworthy, and safe for down-wind sailings and drifts in the high seas even when carrying a numerically inadequate crew or a crew wholly inexperienced in maritime activities or raft navigation.

The first and principle conclusion is borne out by the itinerary of the expedition and the safe landing of the raft's crew well within Polynesian territory. The other discoveries are based on direct observations made by the raft's crew in the course of 101 days in the open sea. Before our departure, qualified mariners and experts in marine architecture had supported the general view of the anthropologists in denying the feasibility of a balsa raft voyage from Peru to Polynesia on the following grounds:

1. Balsa logs were water-absorbent and would become water-logged and sink under the pressure of a heavy cargo after a short drift into the ocean.
2. Balsa was in itself a fragile wood which would crack under the burden of a cargo in addition to its own weight, as soon as bow and stern were simultaneously lifted up by two separate waves.
3. The rope lashings holding the raft together would be exposed to chafing between the large logs, and would be worn through after a couple of weeks, when the different sections of the raft started to twist and work with the movements of the sea.
4. A foot and a half was not enough freeboard for an ocean craft; the smallest wind-waves would constantly keep the deck and hut awash, and in a gale—which hardly could be avoided on such a long journey in a slowly moving raft—both crew and cargo would be swept overboard.
5. Without a regular hull and a keel the narrow centre-boards would not suffice to resist the wind-pressure on a flat-bottomed raft, and changing winds and currents would keep the raft drifting about at random until destroyed or sunk far short of the 4 000 miles distant island-groups of Polynesia.

None of these theoretical weaknesses of the balsa raft proved correct under actual testing. As to absorption of water, we found that the sea-water quickly penetrated the outer surface of the logs to the depth of an inch or more, after which the absorption of water proceeded very slowly until a certain limit was reached, after which hardly any change could be noticed. After less than a fortnight at sea chips and splinters of the soggy outer section of the balsa logs sank when dropped beside the raft, and yet the general condition of the timber was such that the raft could still carry tons of burden upon its arrival in Polynesia. In fact, the balsa raft had still retained the greater part of its buoyancy when finally dragged ashore for preservation in its museum at Oslo, after remaining a year afloat in the Oslo fjord. It looked to us as if the sun-dried, sapless outer part of the balsa logs absorbed water quickly, whereas the water penetration was hampered further in through the presence of the sap from the green tree, or through some other water-repellent attribute of the undried cells in the interior of the log. Certain it is that perfectly dried balsa timber is lighter than cork and can carry enormous burdens, but it seems to absorb water quickly and must therefore be dragged ashore when not in use to maintain its buoyancy. On the other hand balsa logs submerged in water before they are properly dried for sap, as was done by us, are very much heavier and rest deeper in the water, but lose their buoyancy at an extremely slow rate. Experts also maintain that there are three types of balsa wood, all of which may be found in a single stand of the timber, but no such selection was made in choosing the trees cut for the *Kon-Tiki*, other than by picking trees of large dimensions.[1]

It is true that dry balsa in smaller sections is exceedingly brittle, but large and fresh balsa logs are enormously strong and tough, and the *Kon-Tiki* not only withstood the buffeting of towering seas and breakers in two gales at sea, but the nine big bottom logs at least proved to be unbroken after the exceedingly rough landing on the Tuamotu reef.

The soft and almost spongy surface of the balsa logs proved to have no chafing effect either on lashings of rope or of the *bejuco* liana. Such ropes as were not placed in advance inside artificial grooves in the timber, dug themselves slowly into the surface of the wood, where they remained protected against chafing as if wearing against cork. Only in a few cases where lashings were exposed to friction against the cargo, or when two ropes were pressing against each other, did they happen to wear off in the constant independant motion of all the separate parts of the raft.

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[1] In spite of the practical demonstration of the Kon-Tiki expedition, some anthropologists still prefer Lothrop's theoretical conclusions regarding the Peruvian balsa-wood rafts: "These rafts had one great handicap because they lost their buoyancy after several weeks in the water and had to be beached and dried out." (Chard 1950, p. 10.)

Most surprising to us on board was, indeed, the amazing seaworthiness of the balsa raft, and the way the most threatening seas capped with foaming breakers were elegantly and easily ridden by our shallow open craft, with no other effort from us but that of keeping the stern to the wind and sea. Irrespective of the shape and size of the attacking seas, the balsa raft always managed to stay on top like a sea-bird. Only when two high seas followed very closely behind each other did the last break on board astern, while the first still lay under the bows and prevented a quick pitch to meet the coming wall of water. The taking of water on board was limited to the edge of the raft that faced the coming seas, which on our westbound journey constantly meant the stern. Only in exceptional moments, as when we lost control of the raft and turned sideways on to the seas, did the highest breakers break upon parts of the deck platform, or into the open bamboo hut. But even then the water immediately sank through the wicker-work of the plaited totora reed deck, without flooding the whole raft. The effect of the attacking water upon the wash-through raft may perhaps be best illustrated by the experience of two of the crew when an unexpected cascade of water once burst over them while resting outstretched on deck. The men were for a moment lifted right off the bamboo deck, and on any ordinary decked craft they would have been carried into the sea along with the sweeping water-masses. But the moment the big sea fell upon the men it disappeared down through the raft as through a wide open sieve, and the suction of the vertically disappearing water made the men just sink back to their places on deck.

The water that regularly broke in at the steersman's place astern varied greatly in quantity with the size and shape of the seas. But as long as the raft was freely afloat in the ocean, even the largest and most threatening cascades that fell upon us disappeared immediately between the gaping logs astern, as through the prongs of a fork. Throughout the voyage, even during two gales the most severe of which lasted four days, the balsa raft gave a most comforting feeling of perfect security to the crew. Only when viewed from our little inflated dinghy did the raft appear to be a most bizarre and primitive construction, seemingly as often below water as above. Rolling and pitching were very moderate, since the raft never gained a momentum like the rolling hull of a ship. There was no apparent regularity either in pitching or rolling, but much of the motion seemed to be up and down. Whereas the swells and big seas were ascended and thus prevented from coming on board, the round logs had a strangely smoothening effect upon the chopped wind-waves that covered the surface of swells. Although the crest of the seas at times rose very high above the cabin roof on both sides, the water seen between the gaping logs in the cabin floor rose and sank only a few inches in relation to the moving raft, and never rose in cascades through the wash-through floor as might have been expected. All told, the nature of the wash-through balsa raft was such that its crew was freed from the paramount danger of all other deep-sea navigation—namely the threat that the vessel might fill up and sink through leakage or through the entry of big seas over the gunwales. A balsa raft on a transoceanic voyage is unable to sink, because it cannot hold any water that comes on board.

Nor is there any danger that a weather-driven raft in the Humboldt Current will float about at random until it sinks or falls to pieces off the Peruvian coast. By the aid of a lifeboat compass and a sextant Hesselberg managed to trace the approximate position of the *Kon-Tiki* every day, and the entire drift was plotted on a map. Not one day of the 101 were we driven back by head wind or counter current. The average daily drift was 42½ miles, the record being 71 miles while off the coast of Peru, and the minimum advance 9 miles on a calm day when we were drifting southward in a secondary side-current in front of the Tuamotus. The total drift west was 4 300 nautical miles, or almost 5 000 statute miles. From 20 to 30 per cent of the drift was caused by the westward sweep of the ocean current, the rest by the permanent easterly trade winds which pushed us across the surface, and frequently even out of the most swiftly moving water-masses.

During the drift, tests was carried out with the five centre-boards, and some information was secured. But certain evidence quoted above, which we obtained subsequent to the return of the expedition, has caused me to doubt whether we fully understood the use of these boards as a skilled aboriginal balsa-raft crew might have done. We discovered at an early stage that the five centre-boards successfully operated as lee-boards or drop-keels and made the raft move in a forward direction instead of tossing about like a drifting board. About 600 miles southwestward of the Galapagos Islands we also carried out some navigational manœuvres among the upwellings of an underwater current which at that spot caused such a choppy sea that a local reef had been falsely reported. While searching for the reported reef we discovered that the raft could be manœuvred steadily at a surprisingly wide angle into the wind, in fact we could take the wind in almost straight at the side as long as it was still on our quarter. We failed completely in our attempt to turn about and tack into the wind, and as none of us were sailing experts we quickly concluded that a balsa raft could only sail at various points *before* the wind. I have been told since that our bamboo sail-yard was probably secured too low from the cross of the bipod mast to give the sail sufficient freedom, and that a craft capable of sailing so close-hauled before the wind should also be able to tack into it. I do not, therefore, consider it impossible that the aboriginal crews knew how to effect a successful interplay between their rafts' sail and centre-boards whereby they under normal circumstances could carry out all the navigational manœuvres reported by Juan and Ulloa, and later observed and narrated by Morrell, Byam, Skogman, and others.

Like many anthropologists, I have been of the opinion that the use of bipod mast or sheers, instead of the European single mast, was a sign of the inadequate sailing skill of the aboriginal Peruvians. This, too, may be misconceiving. Lothrop (1932, p. 237) says, in dealing with the prehistoric use of centre-boards on the balsa rafts *(jangadas)* of Pacific South America: "The use of sheers in place of a single mast has been advocated for sailing vessels in recent years. It is claimed that the slip stream of the wind is not interrupted as in the case with single mast, while at the same time it is possible to eliminate the shrouds and spreaders. This rig, traditional on *jangadas*, is still regarded as experimental among yacht designers." The balsa raft may therefore very possibly be able to offer still more navigational surprises to the marine experts.

The claim that the lowering and raising of centre-boards could be used for genuine steering instead of a rudder or steering-oar was certainly found to be no exaggeration. Treating the centre-boards from the very beginning as mere lee-boards, we had secured them in a fixed position with wooden wedges and ropes, and were satisfied when we noticed that they helped the raft to keep a constant forward course. At sea, however, one of the centre-boards worked loose and slid out of its crack, so that it lay horizontally underneath the raft for several days. When it was finally recovered and inserted into its crack, we noticed *Kon-Tiki* changing course, although a calm sea and steady wind had then kept us on one course for a couple of days without the use of the tight-bound steering oar. We noticed that if we pulled the same centre-board out again, the raft swung back on to her original course; but if we pulled it only halfway up, she swung only halfway back on to her old course. By merely raising and lowering the loose centre-board we could effect changes of course, and also keep steadily to them without touching the steering-oar. Only then did we understand the *double* effect and purpose of the *guara*. The forefathers of the early marine architects from Guayaquil and Puna Island, at least down to Paracas and Ica, had worked out a simple but most ingenious system of balances by which the pressure of the wind made the sail and mast the fixed point and the bow and stern the mobile arms, which moved sideways as far as the combined centre-board counter-pressure would permit it. If the aggregate centre-board surface aft was largest during a sideways wind pressure, then the stern met with most resistance by the water, while the bow yielded to the wind pressure and swung freely some degrees over until balance was established. But if, on the other hand, the centre-board surface forward was largest, then the stern swung over with the wind. The centre-boards which were nearest to the mast had of course least effect on account of the relation between arm and power. If the wind was due astern all the centre-boards were left out of action and merely cut the water sharply, and it was therefore impossible to keep the raft steady in this one position without continually working the steering-oar.

Owing to our inexperience we neglected the centre-boards during the storms; the ropes that held them perpendicular beneath the raft broke, and thence forward the boards hung loose and swung back and forth under us. On account of the presence of sharks we never attempted to repair this damage, and when we finally drifted straight on to the dangerous reef in front of the Raroia atoll, we found ourselves unable to steer more than slightly over thirty degrees to each side of the wind. We were forced to crash-land on the long windward side of the reef, and this dramatic episode taught us one more practical lesson about the qualities of the balsa raft. The shallowness of the underwater section on the raft, the spongy and tough nature of the huge and massive bottom logs, and last but not least the complete flexibility given by the rope lashings and wicker-work of plaited reeds and bamboos, permitted the craft to carry its crew and main cargo ashore through a veritable inferno of towering surf and sharp corals that would have meant complete disaster to most other seafaring craft.

The danger of falling overboard through an incautious step in rough weather is the only threat to a balsa raft crew as long as the raft is afloat in the open ocean, and this of course, can be avoided with sufficient care. The same danger is immensely increased in case of wreck through the vertical surf on a windward reef, but even this threat can be avoided if the crew take temporary refuge inside the plaited and flexible hut. This was demonstrated by the fact that one of the *Kon-Tiki* crew who did so came through the experience on the reef without strain, being held in safety as in a basket-work cage that collapsed over him but held him firmly in its protection. A well manned raft, however, with its centre-boards still in action could avoid such a fierce crash-landing by steering round the reef and dropping a stone anchor in the sheltered water on the other side of the island.

It is quite obvious that no canoe—single, double, or with outrigger—can offer its crew the comfortable space, carrying capacity, and safety of a balsa raft. This alone will suffice to explain why the aboriginal high-cultures of Peru and Ecuador never developed their marine architecture further in the direction of their inland dug-out canoes or the Chilean planked boat. The balsa raft had by far most of the qualities merchant mariners strive for. Its drawback is a comparatively slow progress through the water. A balsa raft is easily outstripped in a race with a slender canoe. But speed was purposely sacrificed for the gain of security, capacity, and convenience by the merchant explorers and shipbuilders of early Peru. Their water-craft would lose in a race for time, but they had greater qualities which made them win in most respects in the long run.

No feeling is more depressing than that of fighting leakage and breaking seas with a bailer in an open canoe, with sharks waiting for the few inches of extra submersion that separate them from the bailing crew. The present author twice had that experience in the open water between the Marquesas islands, before able to draw a comparison with the complete security of a balsa raft.[1]

Food and water supply

Parallel with the testing of the behaviour of a sea-bound balsa-raft, the Kon-Tiki expedition had the opportunity of studying the marine life round a drifting raft in the Humboldt Current, a detail of interest in the question of how far accidental drift voyagers from Peru could be expected to survive. Access to a continuous supply of fish was verified, and can be judged from the photographs taken en route. (E.g. Pl. LXXI.) The very first day we were left alone on the sea off Callao we noticed fish round the *Kon-Tiki*, but were too preoccupied with the unfamiliar handling of the raft to devote time to further investigation or fishing. The second day we went right into a thick shoal of sardines, and were visited by an 8 ft. blue shark that kept right up to the aft end of the logs. The third day we were visited by tunnies, dolphins, bonitos, and a number of other unidentified fish, and when the first flying fish thudded on board we used it as bait and at once pulled in two large dolphins (dorados) weighing from 20 to 35 lbs. each. This was food for several days. From now on we were either accompanied by fish, or had regular visits from them, every day throughout the voyage. Much of the time we had to ration the fishing, for we would otherwise have caught much more than we could possibly consume. We tried with success to dry fish for storage on the roof of the hut or on the mast, but found this procedure to be of no interest except as a safety precaution, as fresh fish was always obtainable.

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[1] Ellis (1829, Vol. I, p. 164) records how a few Tahitians survived a tempest at sea by converting the woodwork of their water-filled double canoe into what unfortunately was a very undersized raft. He introduced this episode by stating: "The double canoes of the Society Islands were larger, and more imposing in appearance, than most of those used in New Zealand or the Sandwich Islands, but not so strong as the former, nor so neat and light as the latter. I have, however, made several voyages in them. In fine weather, and with a fair wind, they are tolerably safe and comfortable; but when the weather is rough, and the wind contrary, they are miserable sea-boats, and are tossed about completely at the mercy of the winds. Many of the natives that have set out on voyages from one island to another, have been carried from the group altogether, and have either perished at sea, or drifted to some distant island." He tells us how these great Society Island canoes are frequently filled by breaking waves; when this happens the natives have to swim alongside the hull, trying unitedly to press one end down so as to elevate the rest of the canoe above the surface. By their suddenly losing their hold of the canoe it falls back on the surface partly empty. Bailing out the remaining water while swimming beside the canoe, they can finally climb on board again, but during all this outboard struggle with the submerged canoe, the sharks have full opportunity to attack effectively. In the instance recorded it was useless for the crew to endeavour to place their canoes upright or empty out the water, "for they could not prevent their incessant overturning. As their only resource, they collected the scattered spars and boards, and constructed a raft, ..." but the majority of the natives were caught by attacking sharks before the undersized raft could raise the survivors above the surface and carry them to safety.

It caused little surprise to find easy access to fish in the coastal Humboldt Current, where local fishing-craft had been busy supplying Peru with part of its foodstock for centuries, not to say millennia. But contrary to the general prediction, it was possible to fish continuously right along the South Equatorial Current. It is not safe to conclude that the ocean there abounds in fish, since much of the fish-life seen by us from the top of the mast appeared to be concentrated round the raft. But it is certain that in spite of all the fish we caught, the supply around us was always renewed, and many of our marine visitors came and went. It is natural that the silent, slow drift of the log-raft had quite another effect on the surrounding ocean life than that of noisy steamers or quickly passing sailing-vessels.

Seaweed and barnacles immediately attached themselves to the wet balsa and, growing quickly to edible size all over the bottom logs, they provided a welcome addition to the menu. Various plankton, small pelagic crabs and tiny fish found refuge in the seaweed, and this, perhaps, combined with the reflections beneath the calmly drifting flat-bottomed raft, attracted numbers of dolphins that swam continually beneath and around the raft, and occasionally large tunnies that would circle around us for days on end. This unrestricted aquarium always included pilot fish and at intervals many other more casual visitors and passers-by, and was during most of the voyage followed by sharks. The latter were edible and fairly good when sliced and soaked in sea-water overnight, whereas the dolphins were extremely delicious especially when eaten fresh the first or second day after catch. The sharks would slide right up alongside the logs and could easily be caught by hand-harpoon, hook, or even by a quick grip of the rough-skinned tail fin. The pilot fish and remora fish, deserting the captured shark, would in most cases stay with the raft, the former always swimming in plough-formation under the bow or between the centre-boards, and the latter occasionally attaching themselves through suction to the side logs. Almost every morning we collected flying fish that had landed on the low and exposed deck in the course of the night. There were usually half a dozen or more, with a record of twenty-six in one night, all of which had only to be picked up and used for food. Commonly we also found one or two small edible squids among the flying fish on deck in the morning. They did not climb on board, but accumulated a terrific speed under water and by spreading out their side-flaps made a glider flight over the waves as far as their impetus could carry them, just like the flying fish. On specific occasions both dolphin and bonito came aboard with a breaking sea and were trapped as the water disappeared between the logs; and a large tunny was almost delivered to us in the same manner, but managed to jump off the logs. With flying fish and small squids found on deck we had every day an excellent supply of fresh bait for catching dolphin and tunny. The latter were rarer and more difficult to catch, but the dolphin would go straight for the hook; moreover, they kept so close to the logs that we could jerk large specimens up on deck simply by letting them swim over a hooked rod without line.

This experience on a balsa raft drift from Peru to Polynesia shows that it is inconceivable that aboriginal voyagers by similar craft and in the same waters should perish for want of food before reaching land in Polynesia. The Humboldt Current, as opposed to continental mountain ridges, jungles, glaciers, and empty stretches of desert, forms no barrier to primitive migration, but acts in itself directly as both transporter and provider for any Peruvians in buoyant craft. It was principally to satisfy their hunger and *sustain life ashore* that countless aboriginal Peruvians daily went out to sea in their various types of raft; it would, therefore, be confinement to the shore rather than confinement to the sea that would threaten the food supply of these people. Inca Garcilasso (1609 b, p. 49) wrote from aboriginal Peru: "The inhabitants of the sea-coast, besides an infinity of other gods, worshipped the sea, which they called *Mama-ccocha*, or 'Mother Sea,' meaning that it filled the office of a mother, by supplying them with fish."

The fresh water supply is the next problem of importance for deep-sea voyagers. In Peru more than elsewhere even coastal merchant and fishing rafts were generally equipped from their home base with an adequate water supply, since there was a notable scarcity of streams to depend upon for renewed supplies on a voyage along the desert coast. Nor was there any rainfall close inshore from which the voyagers could obtain relief.

We see from the drawings of Ulloa (Plate LXVI: I) and Spilbergen (Plate LXVII) that the early raftsmen carried a supply of drinking water in jars on deck, and the Early Chimu artists (fig. p. 589) verify that this water supply could take impressive proportions. Some iconographic reproductions show that even a small two-man reed-boat, that hardly was away more than a day or so, carried a large water-container. The balsa raft seen by Spilbergen had carried water enough to keep its crew at sea for two months, and the large Indian parties who went by similar rafts to the Lobos Islands carried water enough to last them all for three or four weeks on the barren islands. Tupac Inca's fleet must have carried water sufficient to last an *army* for even much longer time.

Accordingly, the organized parties of merchants, explorers, troops, or guano island visitors, would all be well equipped with drinking-water, and some initial water-supply would also be carried on board other coastal craft, and thus greatly benefit even the accidental drift voyager unexpectedly forced away from the coast by a sudden wind or rapid current. The experience of the Kon-Tiki expedition was that when the coastal water of Peru was left well behind, and the raft came out into the open Pacific Ocean, drizzle and later also strong rain occurred at intervals, which made it possible to collect sufficient rain-water from the hut roof and from a sail spread out on deck, to maintain a ration sufficient at least for survival.

Tests were also carried out with the old native method of chewing thirst-quenching moisture out of raw fish. Alternatively, the juices could be pressed out of pieces of fish twisted in Polynesian fashion inside a cloth, or, if the fish was large, it was sufficient to cut depressions in its side, which gradually became filled with ooze from the fish's lymphatic glands. Although such a beverage would only be resorted to if one had nothing better to drink, the percentage of salt is so low that thirst is quenched. The fish that swim along with a drifting raft in the Humboldt Current are therefore a reinsurance against catastrophe if the water supply should run out between rain showers. Equally important is the fact that the water rations can be considerably extended by the addition of plain sea water. *On hot days*, when perspiration drained the body of salt, we found that it was possible—as recommended by Royal Air Force medical advicers—to add from 20 to 40 per cent of ocean water to our fresh water ration; the somewhat bitter mixture still quenched the thirst without noticeably evil aftereffects. Our water requirements were also diminished by keeping the body frequently under water, for instance by lying down on the after end of the logs where the seas constantly rolled over. In the same connection we may note a remarkable piece of information acquired by Stair, an observant missionary active among the Samoans during the latter part of the last century. He wrote (1895 b, p. 109; also 1895 c) from Samoa:

"And on my query whether they did not often run short of water, they have astonished me by telling me that the early voyagers always took a supply of leaves of a certain kind of herb or plant, as a means of lessening thirst, and thus forming a valuable stand-by on a voyage. By chewing the leaves of this plant they declared that, to a certain extent, they could drink sea water with some kind of impunity, and thus assuage thirst. I made many unsuccessful efforts to obtain the name of this shrub and ascertain its character. The natives I asked said that they themselves did not know what it was, as the custom had grown into disuse; but they were confident such a custom had prevailed in the past, when voyages were more frequently made by their ancestors. I questioned many men of intelligence about the matter, without effect. The constant reply was, 'We do not know what it was ourselves, but we are certain our forefathers were accustomed to use the plant.' Of late years I have ascertained that cocaine has the power of so completely deadening the sense of feeling in the palate and throat that sea water may be swallowed without inconvenience, so far as taste is concerned, but that the consequence of drinking it for any length of time would be disastrous. ... I have thought it possible that some plant of the coca species may possibly exist in Samoa, or some of the Tonga Group. In Peru, the leaves of the coca tree are chewed with wood ashes or lime, and used by Indian travellers and sportsmen to remove the sense of thirst and hunger, and enable climbing to be performed comfortably. Some such custom and habit would appear to have been known to early Samoan voyagers."

We may add that bags of coca leaves have very frequently been found with the ancient mummies buried on the desert coast of Peru. (Safford 1917, p. 409; etc.) Stair's information is highly significant, for not only was highland Peru and Bolivia the early home land of the coca plant (*Erythroxylon coca*), whence the leaves were acquired on the coast, but the culture of this and other American masticatories, the leaves of which were similarly chewed, "seems to have held a great exclusive terrain in the west and northwest of South America". (Sauer 1950, p. 541.)

We have no means of proving to-day whether or not the leaves referred to in Polynesian voyaging legends were the same as those chewed for the very same purpose in ancient Peru, but it is enough that we know for certain that the ancient *Peruvians* had full opportunity, at a pinch, of making use of this their customary means of lessening thirst, while travelling by sea towards Polynesia.

As we have seen, the prehistoric coconut-palms planted on lonely Cocos Island also show that aboriginal seafarers in these waters have appreciated the refreshing drink that could be carried in this natural container, whereas plain water was best carried in tough bump-proof gourd-containers or in giant bamboos with perforated joints, when these are accessible, as in the north in and near Ecuador.

The storage room and carrying capacity of a balsa raft is many times that of the largest known canoe. A medium size raft like the *Kon-Tiki* could with great ease carry 5 tons of cargo, and there was ample dry space inside or forward of the hut to protect it all from the breaking seas astern. We have seen that the larger balsa rafts met at sea by the early Spaniards were estimated to carry up to 30 tons or more. In great baskets, gourd-containers and boxes lashed to the deck, the early Peruvians could without the least difficulty carry enough fresh and dried tubers, fruits, nuts, and other customary food staples of their diet to provide for the entire journey, quite apart from the fishing and food collecting that could be carried out *en route*. The water containers were placed astern or below the reed-deck, where they took up no space needed for the other cargo, and where the water of the Humboldt Current kept them constantly awash and cool in spite of the sun that burnt on the dry deck.[1]

Karsten (1949) has seriously argued that the Kon-Tiki expedition failed to prove the feasibility of a prehistoric voyage from South America to Polynesia, because the expedition crew cooked its food in European style by means of matches and a wooden case with a primus stove. He argues that stone-age people would have had no means of making fire and cooking on a corresponding raft voyage, which in his opinion is a fatal objection to the east-west migration theory, as he never heard of Indians who would eat fish, meat, or sweet-potato uncooked.

I doubt that Indians of any tribe would succumb through a sit-down strike on a balsa raft because their food was not prepared entirely to their liking. In any case, raw fish soaked in fruit-juice is an aboriginal dish both in Peru and Polynesia, and has been served to the present author in both places. Peruvians who have visited Polynesia have pointed out as a curiosity the analogy between this favourite Polynesian dish and the traditional Quechua *cebiche* still eaten by the natives in Peru. We may in this connection also note an interesting statement by Métraux (1940, p. 154), who wrote from Easter Island: "Several travellers have stated that the natives ate raw sweet potatoes to quench their thirst. Thomson expressly declares that 'they ate them both raw and cooked.' "[2]

Still, there is no reason why the early balsa raft voyagers should not also have cooked their food if they wanted to. Any amount of wood could be carried along, even lashed to the outside of the raft, self-supported in the water. Wet pieces would dry up in a day or

[1] Acosta (1590 b, p. 95) wrote from early Peru: "...they put the water or wine which they drinke, into the sea in flaggons to be refreshed, whereby wee may undoubtedly finde, that the ocean hath this propertie, to temper and moderate the excessive heat."

[2] Karsten (*Ibid.*) even goes so far as to claim that sweet-potatoes only remain edible for two or three days, and thus are without value to early oversea voyages. This is incorrect. Sweet-potatoes remain edible even when they are completely dried, and were the staple food on most long voyages in the aboriginal East Pacific. (See Part VII.)

two if cut up and left in the baking tropic sun on the hut roof. Two of the members of the expedition had stacked balsa wood and hardwood in front of the hut, to entertain themselves with wood-carving in time of leisure. This wood, like other deck cargo, always kept dry. If soaked by rain or spray it immediately dried up when the sun reappeared. Any means resorted to for making fire ashore can be resorted to for the same purpose on board a balsa raft. We have seen with Oviedo (1535-48) and other early chroniclers that the first balsa rafts observed by the Spaniards had their "cooking places" in the centre. Ulloa (Plate LXVI) and Humboldt (Plate XXXIII **2**) have shown on their drawings that cooking places were also occasionally built astern on the balsa rafts. The balsa rafts still used along the wide rivers of Ecuador down to Guayaquil Bay have a cooking-place on board in which the fire is kept off the logs by means of stones covered with wet earth or clay. (Heyerdahl 1948 b, Ch. III.) Cooking on board wash-through rafts is also known from Polynesia. Shand (1911, p. 10) wrote of the Chatham Island rafts: "They were large enough to carry sixty to seventy people, ... They carried fire with them for warmth, which was placed on stones and earth on the floor of the raft-canoe." Further (1889, p. 148): "In going to a distance they plaited large baskets (*kona*), which they filled with earth, on which to light a fire and cook food, taking also a large supply of firewood with them, as well as drinking-water."[1] Stair (1895 c, p. 618) states that he often asked the Samoans how they formerly had managed about cooking on long distance navigation, and while noting that even raw fish was considered a delicacy, he also learnt that "provision was made for a fire by building up stones and earth in some part of the hold or shed, whilst water was stored in bamboos, or waterbottles made from gourds or coconuts."[2]

Women among balsa raft voyagers

A few words are also necessary to refute the strange idea that voyagers from Peru would die out after one generation, if they landed in uninhabited Polynesia, because only men would travel on the balsa rafts. This theory, after the Kon-Tiki expedition, was substituted by some Polynesianists for the earlier belief that the rafts of aboriginal Peru had no practical access to Polynesia.[3]

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[1] He adds: "Everything being tied necessitated their taking lashing materials with them wherewith to make necessary repairs."

[2] We may note that in certain cases a taboo existed in Polynesia against lighting a fire while at sea, or even against storing cooked food among the voyagers' provisions. Extensive voyages are on record on which no cooked food was eaten by the crew until after landing.

[3] The argument that there were no women to "mother" the first Polynesians if they had come by rafts from Peru was first sponsored in an interview with Buck (originally *Auckland Star*, N. Z. February 7, 1949) who also argued that hungry Peruvians would consume their whole supply of *kumara* before reaching Polynesia. On learning that Polynesia had been proved to be accessible for a Peruvian raft, Buck maintained his earlier view that the *kumara* had been fetched from Peru by Old World voyagers who had first beaten many thousand miles to windward from Asia by canoe before setting out on their 8 000 miles return voyage to Peru. Nothing was said as to why Asiatics should not have eaten up the Peruvian *kumara* en route, nor why they were considered better equipped for "mothering" oceanic island tribes. Thomson (1871, p. 36) once wrote: "The traditional and invariably policy of Eastern Asiatics has been to prevent the emigration of women. Thus, even in modern times, though thousands of Chinese annually migrate to the Indian Archipelago, no women accompany them." To be fair, we ought to bear in mind that in the emergency of war any people would take their women along. The question is only where they would be able to go.

We have seen, however, in this part that the earliest traditional memories from pre-Inca Peru describe the migration of whole tribes by balsa rafts down the extensive coasts of Ecuador and Peru. In the Chimu territory of North Peru even the name of Chief Naymlap's wife, Ceterni, is remembered and we learn that she was not the only woman in the maritime party. Many centuries later, when written history begins in South America, we learn that women were captured together with the men on the very first well-equipped balsa raft taken by the Spanish explorers in their advance upon Ecuador and Peru. The custom of taking women on distant voyages by balsa raft survived in Peru and Ecuador as long as the vessel itself. Until the end of the last century, native fishermen from Payta and other parts in North Peru carried not only their women, but children, dogs and chickens on their balsa rafts when bringing their heavy cargoes of dried fish by sea to the port of Guayaquil.

We have nothing to guide us but legend alone when it is asked why human families first happened to take up their abode on the utterly isolated, originally uninhabited islands in the vast ocean space between America and Austro-Melanesia. It is possible that men and women sailing in home waters may have been overcome by fog or storm or some other unexpected change in the weather that left them a prey to the prevailing elements at sea; or they might have fled from the coast as fugitives from victorious enemies. They may even for some reason have left their former abode peacefully, on an organized expedition in search of new land. We have already seen that Polynesian legends state allegorically that the earliest god-men, like Maui-tiki-tiki from Hilo [Ilo], discovered Polynesia primarily when out in the ocean on a "fishing trip". More historically worded traditions, as we have seen, claim that the first island settlers were "compelled to leave their original home" because of unrest and enemy pressure. We have even seen (page 59) that the itinerary taken on the organized departure into the open ocean off the continental Fatherland was set by the leader with the words: "Let us follow the sun."

Only when a whole tribe or fleet was actually observed departing would the event be likely to survive also in the memory of people remaining in the home country, as was the case in Peru with Tupac Inca's voyage of discovery, or with the Viracochas' emigration under the leadership of Tici, before Inca times. The Inca party returned, the Viracocha party did not. Inca history tells us plainly that Tupac organized his expedition in search of wealth and to conquer remote islands said to have been visited by coastal merchants sailing on balsa rafts. But it is very vague in stating the cause of the departure of Tici, who also, like the Inca, originally departed from the highlands. It is not plainly stated whether Tici's emigrant party left because of hostilities and trouble, or whether their motive was a religious desire to follow the sun. But it is quite apparent that in Peru, as in other parts of the world, no weather changes have caused as far-reaching disturbances in human settlements and movements as hostilities between jealous neighbours and religious fanaticism. The aboriginal history of Peru is full of local conquests, massacres and expulsions, and hostilities went on in settlements next to the Humboldt Current as well as at sea in balsa rafts, as we have seen from Inca history.[1]

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[1] As an example of the type of warfare that might have occurred many times in the course of Peruvian prehistory, we may note with Acosta (1590 b, Vol. I, p. 150) that Inca troops from the highlands once occupied the coastal valley of Cañete while their numerous local enemies were far out on the Pacific fishing from their reed-

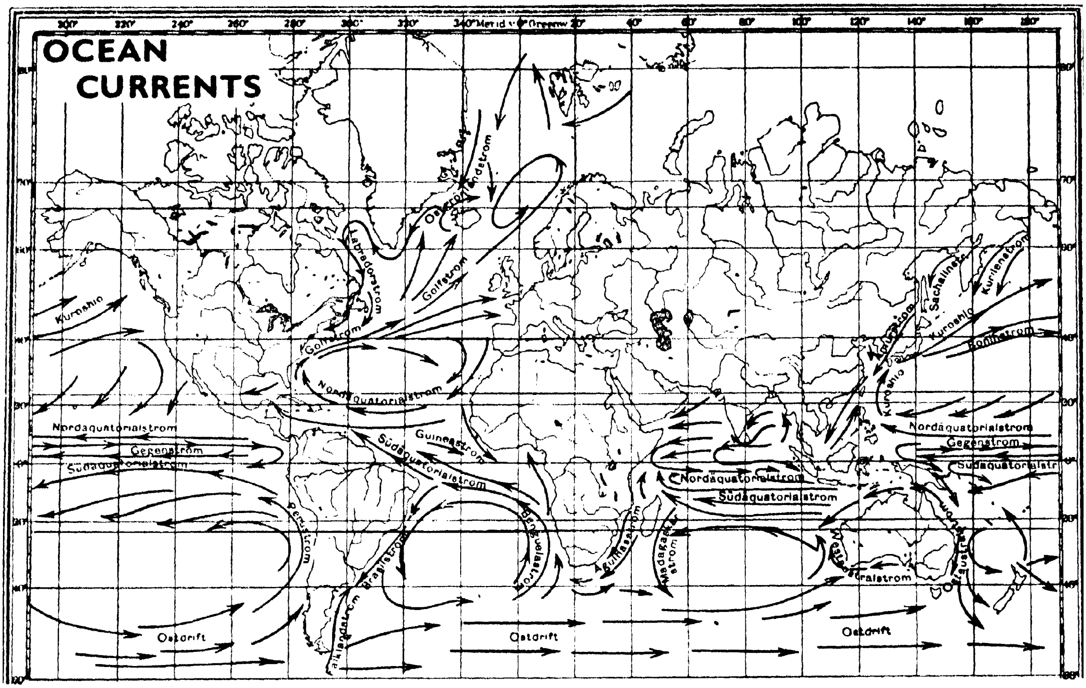
The sea-road of the Humboldt Current

The gigantic circulation of surface water that takes place in the South-east Pacific is, in its major movements, well known. Down in the "Roaring Forties" a cold ocean current drifts east towards Tierra del Fuego and southern Chile, where part of the water passes south of the Americas and into the extreme South Atlantic Ocean. The other part is blocked by the projecting tip of the South American mainland, and is forced in a big circular movement up along the Chilean coast. While still eastbound towards Southern Chile, this current is generally accompanied by a west wind drift and is occasionally suggested by anthropologists as being an inviting highway for eastbound migrations across the Pacific. However, the severe climate caused by the proximity of the Antarctic and the wide belt of drift ice, as well as the almost constant gales and ferocious seas, make this part of the ocean most unsuitable for long expeditions by aborigines in open craft. The cold water from this current, which sweeps at a considerable speed up along the whole Chilean coast, continues along the shoreline of Peru as the Peru- or Humboldt Current, while gradually gaining temperature. Approaching the equator the whole flow of water rapidly turns in a great sweep due west, is now called the South Equatorial Current, and bears directly down upon all the island groups of nuclear Polynesia. Finally, branches of the same drifting mass of water bear through Melanesia down upon Australia, New Guinea, and Indonesia. Gaining temperature as it comes up the South American coast towards tropical latitudes, this current abounds in fish to tempt the shore-dwellers of Peru, and it is accompanied all the way to Polynesia, Melanesia, and the remote West Pacific by a strong westward beating trade wind. Nowhere in the world has nature formed a "sea-bridge" better suited for trans-oceanic voyaging or displacement of man than this one-way ocean escalator from Peru westwards across the Pacific island territory.

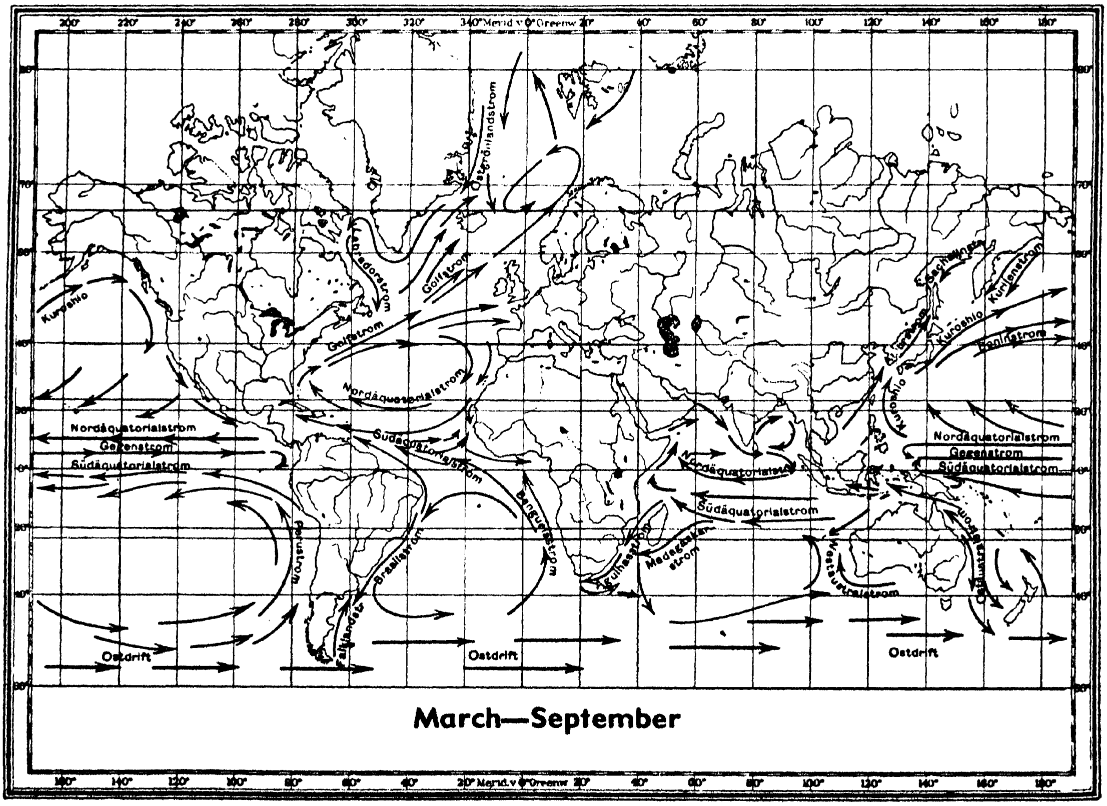
It is quite obvious that the rapid drift of the local water-masses was known to the Inca and pre-Inca fishermen and voyagers who struggled with aboriginal craft in these waters for untold generations. The Spaniards noticed it as soon as they arrived with their caravels. Andagoya (1541-46, p. 76), the first European to try to advance along the Pacific coast of South America, wrote: "There are many currents in this South Sea, for which reason it can only be navigated close in shore, except with long delay. They go up the coast every afternoon, and with the tide; for there are many points where the wind alone does not suffice to stay the current." A decade after the discovery of Peru this chronicler could state (*Ibid.*, p. 77) that the best time for navigation from Panama to North Peru was from January to May, when northerly winds interrupted those from the south in the intervening coastal region. Observations of the strong local currents were also immediately narrated by Cieza (1553), Zárate (1555), and subsequent chroniclers.

As the main Humboldt Current sweeps up the Peruvian coast, small eddies and subsidiary counter-currents are formed close to the shore in several places. This is especially marked in the north. Thus we learned from old local people that rafts south-bound from Guayaquil to Paita and Piura kept very close inshore, where a current usually went south along the land, but in returning north they went further out into the ocean to get the benefit

floats. They laid themselves in ambush waiting for the returning mariners, and thus succeeded in massacring the "manie thousand Indians, which went to sea in their vessels of reeds..."



September—March



March—September

(From Hambruch 1908.)

of a northbound branch of the Humboldt Current. Similar manœuvres are still carried out by small modern craft all down the Peruvian coast.

Although the bulk of the water only turns west in one main mass off the coast of what was once the Chimu habitat in North Peru, the outer edges of the current send off branches to the west all the way from the latitudes of Northern Chile and southern Peru. On the inner side of the current, close to land, secondary submarine currents come to the surface and feed water into the main body of the moving water that forms the Humboldt Current. Gunther (1936, p. 59) describes this outbound flood of the water near the shore as: "Upwelling of lower layers which may be looked upon as vertical currents of compensation for surface water drawn off towards the west." Showing that the rapidity of the Humboldt Current itself is greatest on the side nearest land, Gunther adds (*Ibid.*, p. 49): "It is therefore probable that this decrease of northerly drift with distance from land is attended by an increasing set towards the west. The universality of upwelling off both Chile and Peru is indeed evidence that westerly set of the surface layers is in progress." And (*Ibid.*, p. 55): "Westerly set has usually attracted most attention off northern Peru, ... off the Lobos Islands vessels have been set as much as 36 miles to westward of their course. Westerly set has also been mentioned particularly off the Pisco region, ..."

These are interesting data, for we have seen that whole parties of Indians on board balsa rafts, with food and water to last them for weeks, regularly sailed out to these Lobos Islands, and thus each time ran the risk of being trapped by the strong westerly set of water, which encounters no land short of Polynesia. The strength of the westerly set of the current in the Pisco region, especially off the Paracas peninsula, is also important. The strong current and high seas in the Paracas fishing-grounds are famous among the local fishermen even in our day, and it is ashore this peninsula that the *uru-kehu* haired Paracas mummies are buried, while an abundance of locally excavated centre-boards bears witness to the pre-Inca raft activity in this very area. The westerly offset of the current from the Pisco area, Ilo, and Arica, does not, like the main westward sweep from Central and North Peru, span the entire ocean in full strength as far as to nuclear Polynesia with the Tuamotus and the Marquesas, it tends to send branches southwest long before these islands, bearing in narrow curves down upon Easter Island, Sala-y-Gomez, and surrounding waters.[1]

Off the coasts of Puna Island, Guayaquil and the extreme north of Peru, other strong movements take place at sea. This is just above the turning-point of the main water-masses, and strong eddies and accessory currents dominate the region. A slight northbound leakage of cold Antarctic water from the Humboldt Current mingles with hot and poorly saline water coming south in the form of the peculiar *Niño* (Infant) Current, and strange and unpredictable currents are formed where the two press each other westwards into the ocean in the direction of the Galapagos Islands. The strength of this southbound *Niño* Current is very variable, and in certain years it flows in strength as far south as to Callao

[1] The climatic conditions of coastal Peru are thus summarized in Blair's *Climatology* (1942, p. 293): "Along the coast of Peru the ocean currents and the winds are deflected to the left. The winds become south or southeast trade winds, almost parallel to the coast or somewhat offshore, resulting in an upwelling of cold water close inshore. These winds, which are both cold and offshore, produce no rain; hence, from the northern border of Peru to latitude 30° S. the coastal region is practically rainless. The upwelling cold water near the shore is the cause of some condensation, however. Along the southern half of the Peruvian coast, especially in the vicinity of Lima, the humidity is high, there is much cloudiness, and there are frequent dense fogs, attended by light drizzling rain."

or even Ica, bringing a sudden rise in temperature so catastrophal that fish and plankton die in enormous quantities, discolouring the water all along the coast as they decompose. The dreaded *Niño* Current is therefore often popularly referred to as "The Painter". (Gunther 1936; Murphy 1937; etc.) There is also a seasonal variation in the meeting-place of the two deflected currents. From May till November the northern branch of the Humboldt Current forces its way far up the central coast of Ecuador before it is forced west by the Niño Current, but from December till April of each year the warm rain-accompanied Niño Current dominates the entire coast of Ecuador. (Ferdon 1950 b, pp. 35, 43; Blair 1942, p. 273; etc.) Normally the southbound *Niño* Current and the northbound Humboldt Current intermingle and turn west together in the fishing-grounds off the coast between Puna Island and Paita in North Peru. It was just in this treacherous area that Skogman (1854, Vol. I, p. 163) about a century ago found the lesser coastal traffic to consist of balsa rafts navigating with sail, centre-boards and steering-oar, while describing from own experience in that pre-mechanical time, how he took six days to go by sailing ship from Callao to Puna, whereas the opposite journey required 15 to 20 days and often 70 to 80 days. He adds with reference to the local currents: "One can easily perceive the necessity of having good sailing craft for navigation along this coast, ..." The same voyager, we have seen, states (*Ibid.*, p. 164) that the local balsa rafts even went as far out as to the Galapagos. These islands, right on the equator, are surrounded by very strong eddies, but the main ocean around them is on a steady westward move. Stewart (1911, p. 240) writes from the Galapagos: "*Oceanic Currents.* The northern islands of the group, viz. Abingdon, Bindloe, Culpepper, Tower, and Wenman, lie in the direct path of the Panama Current, and the water surrounding them is several degrees warmer than that around the southern islands, which are bathed by the Humboldt Current." Garnier (1870, p. 20) again says of these waters: "Even in our days, the whalers crossing off the American coast, to the Galapagos, can only with difficulty remain in these regions, because the currents carry them forcibly towards the west, and it is said about one that twice during the same year it was forced to run to the south right down into the variable winds, in order to be able to voyage towards the east." He quotes Moerenhout who, sailing in the Pacific, found the current so strong that at times he could not force his ship east, but drifted back towards the west from 20 to 60 miles a day.[1]

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[1] See also Hooker (1851, p. 252), who describes the currents that reach the Galapagos from Peru and Panama and influence the local island flora accordingly. Hornell (1946 a, p. 55), records how drifts of modern wrecks and drift-bottles from Peruvian waters all go to Polynesia and Melanesia. A classic example not included by him is that of the Brazilian artist family Bernardelli, which, just a century ago, set out from Central America down the Peruvian coast, bound for Chile. The sailing vessel which was to take them there lost its bearings entirely, and when land finally was sighted the ship was wrecked on what proved to be a Polynesian island near Tahiti. More recently Jacquier (1948) records how the Kon-Tiki drift voyage was followed up a few months later by a 30 ft. cutter built on Easter Island. Manned by a crew of nine Polynesians without map or compass, the vessel was driven to sea from Easter Island in bad weather on December 24, 1947. On January 30 it landed on Reao atoll in the Tuamotu archipelago, 1 200 miles to the west. The crew, ranging in age from 56 to 11, carried no food supply other than that which was consumed in the first days, and subsisted thereafter on the very little fish they caught en route as well as rain water. To reduce their thirst they kept their bodies under water for hours on end. Macintosh (1948, p. 123 etc.) also accumulates weighty and purely practical evidence to show that, among the early European discoverers, in recorded modern drifts, and in natural oversea migrations by aboriginal craft, "wind and current

We saw in Part II how Selling's pollen statistics in Hawaii are able to show the main aspects of the climatic conditions in that northern area at the prehistoric period when a fleet of Northwest Indian canoes was believed to have reached the Hawaiian group. Analogous information with regard to the climatic amplitudes—and associated variations in wind and ocean current strength—has been made available in the Southeast Pacific by the Swedish Deep Sea Expedition (Petterson 1950), through an analysis of marine plankton sedimentation on the actual ocean bottom. Arrhenius, who took part in the expedition and is in charge of the geological material and its treatment, informs me (*viva voce*; see also Arrhenius 1950) that an increase in the strength of the ocean current means also an increase in upwellings and water circulation, which again results in increased plankton activity and a more rapid sedimentation of fallen dead plankton during the specific periods and in the particular areas where such increases in the current strength have taken place. An analysis of the stratification of the bottom sediment can, therefore, reveal possible chronological changes in the route and strength of the principal ocean currents. Such an analysis was made possible by the systematic deep-sea borings of the *Albatross* Expedition, which brought back for laboratory analysis a large number of sediment cores from the Pacific ocean bottom, each core varying in depth from eight to fifty feet. After a symposium in which international specialists dealt with meteorological views on the climatic changes in the Quarterary period, Arrhenius wrote to me as follows:[2]

"The trade wind and equatorial current systems are very sensible even to small climatic changes. An aggravation of climate in higher latitudes seems, in the equatorial areas of the Pacific, to manifest itself through an increasing intensity of the trade winds and the equatorial currents. The *course* followed by the latter however, seems to have been very stable throughout the Pleistocene. As far as the South Equatorial Currents are concerned, such climatic aggravations as those which have repeatedly occurred in historic times cause an increase in the strength of both the westerly and the southerly moving currents. On this the upwellings of deep sea water increase along the edges of the moving water, and thereby increases also the production of plankton and fish in the currents, whereas the surface temperature sinks. Changes in the climate which have an unfavourable effect on the human culture in higher latitudes and probably also on the west coast of South America, have accordingly improved, or at no rate worsened, the possibilities for migrations from Peru to Southern Polynesia."

In other words, a systematic analysis of deposited marine plankton on the Pacific Ocean floor shows that the westbound Humboldt Current throughout human times has followed very much the same track, but that its speed and intensity in our modern time do not represent a maximum. The westbound urge of the Humboldt Current and the trade winds was stronger in the early centuries of our own era than it is to-day.

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are almost invariably the major factors." He opposes the often sweeping and speculative foundations for many views as to transoceanic migration routes, and states (*Ibid.*, pp. 123, 141): "In the past many anthropological theories have ignored the effects of wind and current and have postulated purposeful waves of migration in the teeth of both." Also: "Many migration theories ignore the opposition of prevailing ocean currents and winds. Examples are quoted to show that in the vast majority of recorded cases these are the major factors. The inability of native craft to beat to windward applies also to Polynesians and Malays and, until the 17th century, to Europeans also."

[2] Letter to the author dated May 3, 1950.

Conclusion

If we add up the evidence accumulated in the present part, we find that coastal Peru in prehistoric times was not inhabited by a land-locked nation of agriculturists, but by successive generations of people whose cultures were based in part also on a strongly maritime economy, with fishing and coastal trade. The marine architecture of Peru had followed ideas alien to our own conceptions of the ideal water-craft, but resulting in vessels that were cheap and easy to manufacture, and highly suitable for their various local purposes. The simplest of these craft, used individually by the multitudes of poor but venturesome and maritime fishermen, consisted of a *caballito* of reeds or buoyant wood, or of inflated seal-skin floats; the more complicated vessels were regular reed-ships of complex design, or navigable log-rafts. The aboriginal Peruvian navigation in the extreme East Pacific went on for untold centuries in such wash-through raft-boats of various designs, the chief of which was the slow-moving but perfectly safe, commodious and capacious balsa raft. While possessing since time immemorial these ingenious types of craft which they freely utilized—often on daring enterprises—the early Peruvians lived virtually on the edge of one of the world's largest currents, which throughout human times has rolled uninterruptedly from their home waters straight to Polynesia.

Leading experts on Polynesian craft have found reasons for suggesting that much of the early movement into Polynesia was carried out by people who used some sort of sailing rafts rather than canoes. These, we can safely state, would have had great practical difficulties in forcing their way up east from Indonesia, whereas the sailing of rafts down to the west from Peru would be absolutely natural, if not unavoidable, in the long periods of high culture and vivid activity on the western side of South America.

PART IX

POLYNESIA AND SOUTH AMERICA; SOME INHERITED ANALOGIES

POLYNESIA AND SOUTH AMERICA: SOME INHERITED ANALOGIES

Great cultures rise and fall, but they rarely disappear without leaving at least some inheritable impression among the surrounding peoples, or directly on their own local successors. There must have been many peoples surrounding the great culture-founders of the aboriginal Andes, and we know that some of these intimate neighbours, including the ancestors of the local highland Incas, had drawn much inspiration from the knowledge and activity emanating from the various early centres that flourished along the Andes in the early centuries A. D. Turning to the adjoining ocean, we find that the Melanesians from Fiji and farther west are the only near neighbours to the early culture-bearers who first settled Polynesia; but inside Polynesia itself the intermingling between the primary and secondary settlers would give greater opportunity for direct local inheritance in that area than existed in Peru. Thus, both in the Andean area and Oceania the historic tribes have inherited or borrowed a certain number of traits which were not originally their own, but came down to them from an earlier local era.

We have so far seen that certain unexpected Caucasian-like traits were shared by some of the peoples who brought high-culture into Andean South America and Polynesia. (Part V.) We have further found that there are striking analogies between the enduring works left behind by prehistoric stone sculptors and masons in the two areas. (Part VI.) Furthermore, we have evidence that aboriginal agriculturists brought to Polynesia a number of such important prehistoric Peruvian crop plants as would be able to grow under Polynesian soil and weather conditions. (Part VII.) Finally, we have seen that the aboriginal Peruvians possessed such craft as would be required to carry the culture-bearers and their crop plants westwards across the water, and that noticeable vestiges of the strange Peruvian types of craft had survived in various parts of Polynesia. (Part VIII.) We shall now turn our attention to the known fact that remarkable cultural analogies exist between the otherwise unrelated historic occupants of the South American continent and the East Pacific islands. Although the peoples who to-day share these analogies are not directly related or connected, it is the writer's belief that both have benefited from the cultures of earlier peoples in these two regions who were related.

One of the best known efforts to collect and list cultural parallels between Oceania and South America (with Panama) has come from Nordenskiöld (1931) in his important study *Origin of the Indian Civilizations in South America.* After enumerating 49 material culture elements common to these two geographic areas, the author concludes (*Ibid.*, p. 20): "As to the majority, they must either have arrived in America from across the sea, or else be independent inventions made by the Indians of tropical or sub-tropical America." The third possibility, that these elements were *exported* from America, is strangely enough overlooked by Nordenskiöld, as by so many others who have found it natural to consider Pacific analogies up-stream only. Under the heading " 'Oceanian' culture elements in South America", he writes (*Ibid.*, p. 16): "As is well known, we find in South America quite a number of culture elements for which parallels are found in Oceania.[1] *These we may call 'Oceanian', although this certainly does not imply any proof that they have been imported into America from Oceania.* These 'Oceanian' culture elements may derive their origin from the crew of some weather-driven vessel, because the possibility of such having landed upon the coasts of America is not entirely to be disregarded, as Friederici has fairly convincingly shown. Some of them may also originate directly from actual immigrations of exceedingly remote date into South America from across the ocean. Or, with one or two exceptions, these culture elements may simply have been independently invented both in America and in the Old World." To this he later adds (*Ibid.*, p. 75): "Cultural influence from Oceania—so far as we are able to speak of such a thing—must in the main date from some exceedingly remote past, before the banana, sugarcane, fowls, and domesticated pigs were known in Oceania."

A criticism of Nordenskiöld's work was published by Emory (1942 b), but the latter did not note that Nordenskiöld, in testing up-stream diffusion versus independent evolution, had overlooked or omitted to consider also the third possibility: a down-stream leakage. Emory thus restricted his criticism essentially to showing that a striking number of the elements listed by Nordenskiöld were absent from Polynesia or Peru, while occurring in many cases in such widely separated areas as Melanesia and interior South America. This indeed, would weaken the diffusion theory. But if we assume that a homogenous high-culture had once spread from the Andean region down across the formerly unexplored and unoccupied sea, then many inland South American tribes must have had early contacts with a people that later intermingled with Melanesians. In this case there may still be some arguments for diffusion among Nordenskiöld's many parallels, although they would then have to be listed under a different caption, not as "Oceanian" culture elements in South America, but as "South American" culture elements in Oceania.

A mere numerical presentation of ethnological parallels cannot do much more than indicate perhaps, a former exchange of ideas. Even so, the strength of a list of material cultural parallels lies almost entirely in its cumulative force, which reduces the likelihood of coincidence or independent invention. Its weakness is that the list may be broken up by critical reviewers into separate parallels which independently offer no conclusive evidence and may be discarded one by one as affording no satisfactory proof of transfer. Unless adequate attention has been paid to the question of reciprocal chronologies and feasible routes of exchange, a list of material cultural parallels is highly vulnerable and merely calls for differences of opinion that are maintained until discussions gradually peter out. (E. g. Emory 1942 b; Heine-Geldern 1950 b; etc.)

Since the present Andean peoples admittedly have had very little or no contact with the present peoples of Oceania, we shall gain little actual information by a mere random listing of the many noteworthy parallels that happen to exist between the two geographic areas. Botany has shown that we are not confronted with impressions left upon the Andean peoples by intruders from the Pacific islands. But some early South Americans have brought various local plants, like the Peruvian cotton, *kumara*, gourd, etc., out to the Pacific islands. It would, therefore, seem more helpful to approach the series of concurring American-Oceanian elements with the object of finding which of them *might* have accompanied the human transmitters of these crop plants out of South America, than to strive to show how far it seems possible to propose independent evolution behind the concurring items on the list. We cannot in any case succeed to reduce the list to zero. (Emory 1942 b, p. 134; Heine-Geldern 1950 b, p. 190; etc.)

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[1] He adds in a footnote: "See especially the works of *Rivet*, *Friederici*, *Graebner*, *Pater Schmidt*, and *Imbelloni*."

The picture-writing of Easter Island

Instead of reviving the various existing lists of South American Oceanian parallels, we shall approach the problems that still confront us inside Polynesia, and see to what extent they may be better understood if we assume that other culture elements besides living crop plants and enduring stone monuments have survived now extinct or absorbed South American settlers in Polynesia.

One of the most conspicuous secondary problems with which we are still confronted is the occurrence of a prehistoric script on Easter Island. Before they came under European influence the isolated tribes on Easter Island were already in possession of a number of wooden tablets covered by rows of inscriptions or pictographs (termed *rongo-rongo* by the aborigines), which are still undeciphered to-day. It has been a much debated question whether or not the present Polynesians have fully mastered this script, although the tablets were preserved by them in their own houses, and were regularly "recited" or chanted from on ceremonial occasions. Learned Easter Islanders, termed *tangata rongo-rongo*, supposed to be initiated in the reading of the *rongo-rongo* text, would recite at length with their eyes on the tablets, but when interrupted they had to go back to where they started, as they could not pick up the text at any given spot on the board. Nor could any of them satisfactorily interpret or explain the various signs, or read a group of signs, or transfer the writing-system of the tablets to other texts or topics. There is, therefore, fairly good reason for believing that no historic Easter Islander actually understood the individual signs or the actual system of the pictographs, but that they were able to associate the different texts they had learnt by heart with the respective tablets with which they had become familiar and preserved (or copied) through generations. One of the Easter Island tablets is definitely not prehistoric, since it is carved from the blade of an eighteenth century ash oar. (Lavachery 1934.) This however, does not necessarily mean that a new text was composed in historic time; more probably it means that the text of an old tablet had been transferred to a new one.

Thomson (1889, p. 514) was the first to secure valuable information about the tablets, although he found no native who could actually read and write the pictographic lines. Through him, the principal early authority on the Easter Island lore, we learn that Hotu Matua, the first Easter Island king, "brought with him to the island 67 tablets containing allegories, traditions, genealogical tables and proverbs relating to the land from which he had migrated. A knowledge of the written characters was confined to the royal family, the chiefs of the six districts into which the island was divided, sons of those chiefs, and certain priests or teachers, but the people were assembled at Anekena Bay once each year to hear all of the tablets read."

The basic problem of the Easter Island tablets is not that they are as yet undeciphered, nor that written characters or symbols like those on the Easter Island tablets are unknown anywhere else in the world. There may well be very little information to be gained from the Easter Island tablets beyond what we already know from chants and traditions of the present population. Nor is it so strange that the outward appearance of the various ideograms is unique, for they may well be stylistically adapted to suit local preferences in shape and artistic design. The most remarkable thing about the written tablets is that they demonstrate that picture-writing was known on Easter Island, although completely absent among all the hundreds of island tribes westwards across the whole Pacific. The invention of the principles of script is elsewhere considered one of the highest cultural achievements of any prehistoric civilization. It would seem most unjustifiable to suggest that this invention was independently evolved on tiny, isolated Easter Island, when most other world centres of script have a common background or result from a prolonged evolution within outstanding cultural centres. All the natural qualifications for the development of writing are absent from Easter Island—more so, probably, than anywhere else where man has settled. A great nation, with an elaborate social organization and the need to convey messages over wide areas, would be likely to acquire script, especially when exposed to trade and impulses from neighbouring civilizations. All these conditions were drastically reversed among the aborigines on this isolated speck of land in the far Eastern Pacific. If peopled from Asia, Easter Island would be the remotest and last discovered foothold in the entire Pacific, with less time for the local evolution of script than any of the thousands of islands nearer Asia. All told, the little colony on barren Easter Island may be said to represent the antithesis of what should be expected from one of the world's exceedingly few centres for the development of script.

If we agree that the idea of picture-writing was imported into Easter Island, it would perhaps be natural first to turn our attention across the sea towards Asia, since the early civilizations of Peru are generally considered to have been wholly ignorant of the art of writing, as opposed to the other New World high-cultures north of Colombia. But observers have also looked westwards across the Pacific in vain for ideas that could have inspired the Easter Island picture-writing. Apart from the wholly different writing system of China there is nothing to suggest a connection anywhere in East Asia. Most writers, therefore, have been forced to conclude that the Polynesians, when settling the loneliest and furthest from Asia of their islands, suddenly duplicated the ancient invention of script. But in 1932 de Hevesy tried to establish that a connection existed between the scripts of some Indus Valley seals and the Easter Island tablets, a theory which aroused much heated discussion pro and con. (Hevesy 1938.) Langdon, Heine-Geldern, Ross, Rivet, Stephen-Chauvet and others defended de Hevesy's view, but Métraux (1938, p. 219) wrote with reference to the general culture of the early Indus Valley centres (Mohenjo-Daro and Harappa): "Not a single feature of their civilization points to a possible connection with Polynesia." Analysing the alleged similarity between the local script and some of the signs on the Easter Island tablets, he concluded (*Ibid.*, p. 235): "No unbiased man who studies the tablets and the Indus script can fail to notice the enormous difference, not only in the system, but in the form and type of the signs."

The view, due to certain superficial similarities in form, that a few of the ideograms on the Indus Valley seals had spread to the Easter Island tablets was not well enough founded morphologically to stand the test of geography and chronology. Writers still quote each other on the fantastic spaces of land, water, and time that separate the Easter Island tablets from any contact with Indus Valley seals. Thus, reviving the *rongo-rongo* problem, McCarthy (1950, p. 144) recently wrote: "Buck [1938 a] disposes of the similarity of some of these symbols to those of the ancient city of Mohenjo-Daro, in the Indus valley of India, by pointing out that the boustrophedon arrangement of the lines, with each alternate one upside down, is unknown at Mohenjo-Daro, that the latter city is dated 2000 B. C., and that the symbols could not have survived unchanged a journey of some thirteen thousand miles[1] of ocean and islands, leaving no trace en route, during a time span of some three thousand years."

Those who ignore the fact that emigrants from the Indus Valley to Easter Island must cover exactly half the earth's circumference to find their destination, should at least consult geography and note that a westerly route is greatly favoured by the elements, with Africa and America as stopping-places rather than the Far East, Australia and Oceania. As mentioned by Métraux (1938, p. 219), the Indus Valley seals are found as far off as Mesopotamia, establishing the interesting fact that relations existed at least thus far west as early as the third millennium B. C. The same author says, opposing the method of de Hevesy's direct comparison between the Indus Valley script and the pictographs of Easter Island (*Ibid.*, p. 238): "I could compare the Indus script with the pictographs of the American Indians and find as much resemblance...If scientists insist upon connecting Easter Island with the Indus Valley, I claim the same privilege for the neglected Cuna Indians of the modern Republic of Panama. I might also include the Ojibwa."

We have now circumnavigated the world and are back in America. Although Métraux perhaps did not intend to call attention to the analogies between the picture-writing systems of Panama and of Easter Island, the present writer finds it worth while to go a little further into the question. For the Cuna Indians on the southern neck of the Panama Isthmus are 900 miles closer to Easter Island than are the Polynesians who live in the Tonga Group, and we are now at least getting within the limits of feasible voyaging distances for primitive craft.[2] Even the ancient centres of writing in Mexico, Yucatan, and Nicaragua are nearer to Easter Island than are all the West and North Polynesian islands.[3] Purely geographical reasoning will, therefore, imply two feasible alternatives for the origin of the Easter Island script. It either originated locally or was inspired from the New World. The absence of comparable picture-writing on the half globe between Easter Island and the Indus Valley by way of Indonesia should make even the most extreme circumglobal diffusionists realise, on practical grounds, that no external inspiration of the Easter Island tablets is possible unless it came from, or by way of, one of the old American centres of picture-writing.

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[1] McCarthy says "three" thousand miles, but by a misprint in quotation.

[2] It is 3 000 miles from Southern Panama to Easter Island. The *Kon-Tiki* raft covered 4 300 miles from Peru to the Tuamotus.

[3] The distance from Mexico City to Easter Island is 3 200 miles (Rand McNally Indexed Terrestrial Globe), whereas the distance from the coast of South Mexico naturally is still shorter.

Picture-writing in aboriginal America

The Cuna Indians of Southern Panama live on the narrow neck of land which migrants from Mexico and Central America would have to pass to reach the Andean area of South America. Their habitat is more than half-way from Maya to Inca territory. Linné (1938, p. 169) says: "From the coastlands of Peru and Ecuador we have legends of invasions from the north, and not in the character of myths, but rather of traditions, although they are vague. While certain elements among the Cuna Indians of Panama and northwestern Colombia, above all picture-writing, bear witness of connection northwards, the noteworthy archæological finds in the province of Coclé are rather pointing to South America." It is accordingly most reasonable to suppose that the Cuna tribes or their ancestors were among the marginal tribes geographically exposed to impulses from active early high-cultures that visited or passed through their isthmus territory.

Nordenskiöld (1928, p. 13), who observed the picture-writing still in use among the modern Cunas, analysed the system and found ample indications that "the Cuna picture-writing originates from the picture-writing that existed in this part of the world at the time of the discovery of America." He shows, with the early chroniclers Martyr and Enciso, how certain aboriginal tribes on the Panama Isthmus, at the time of European discovery, proved to be in contact with tribes which possessed picture-writing and books. Some of these, he shows, were probably the Nicarao Indians inhabiting the Pacific side of Nicaragua a few hundred miles up the coast, and half-way to the main American centres of script in Mexico and Yucatan. He states (*Ibid.*, p. 14) with Oviedo (1535-48, Vol. IV, p. 36) that these Nicarao Indians, when Europeans arrived, had parchment books about as broad as a hand and ten to twelve feet long, folding up to the size of a man's hand. The parchment was painted with figures in black and red. In the same early century both Simon and Castellanos relate that the South American Catia Indians (near Antioquia, Colombia) possessed picture-writing which was either painted on cloth or engraved on other materials. Both these tribes to the south and the Nicarao in the north were probably in contact with the Cuna and other Indians of the Panama region. (*Ibid.*)

As to the Cunas, Nordenskiöld shows that earlier writers have only mentioned their manners and customs in passing. But he states, referring to two modern writers who visited them early enough to observe some of their aboriginal customs: "In his excellent work P. Gassó writes that these Indians practised a kind of picture-writing on wooden tablets. But he gives no further particulars of this writing. The distinguished American biologist Dr. Harris visited the Cunas for the purpose of studying, from the point of view of heredity, the albinos, or so-called white Indians, of which there is frequent occurrence among them. He noticed that the Cunas possessed a sort of picturewriting which they made use of for recording songs of various kinds. This writing, Harris says, is read from the bottom, from right to left, and then from left to right, and so on."

Nordenskiöld (*Ibid.*, p. 16) adds from his own experience: "We succeeded in collecting a fairly extensive material of the picture-writing from the Cuna Indians. These specimens are drawn on paper obtained by the Indians from the whites. ... More exceptionally the picture-writing is painted on wooden tablets. This material, according to what I have been told by the Cunas, would be the original one, which is also corroborated by P. Gassó. One of these wooden tablets with drawings of exceedingly fine workmanship of demons' habitations is among the most valuable things of our collection. ... The fact of wood having been the original material on which the writing was drawn speaks in favour of its being primitive, and not having come into use owing to influence from the whites." Further (p. 18): "The mode of reading picture-writing from right to left, and then from left to right, as well as beginning the reading in the right-hand corner at the bottom, goes to prove that the idea of Cuna picture-writing has not originated under the influence of a knowledge of white men's writing." His general conclusion is (*Ibid.*, p. 21): "From the above will be seen that there is nothing indicative of the Cuna picture-writing having come into being from any white influence. It bears no resemblance to the much more developed writing of the Mayas. What it most resembles is possibly the picture-writing of ancient Mexico, and I incline to the opinion that it constitutes a degenerated form of it. In support of this view there is Martyr's account, above referred to, from which it appears that the Darien Indians in the beginning of the 16th century carried on intercourse with Indians who possessed a kind of picture-writing probably resembling that of Mexico."

Instead of accepting Nordenskiöld's fairly reasonable proposal that the Cuna script was simply a degenerate form of the ancient Mexican picture-writing, Hornbostel (1930) observed a number of specific analogies with the written tablets of Easter Island, and was led to assume a Polynesian origin for the Cuna script. Since writing was unlikely to have originated on Easter Island, he was bound to search a primary or source origin somewhere else, and had recourse to ancient China as the Old World centre from which the idea of writing crossed the whole Pacific against the wind by way of Easter Island to the Cuna Indians of Panama. He then proposed that Easter Island and Cuna picture-writings were the primitive forerunners of the highly developed Mexican writing. The loose basis for Hornbostel's inclusion of China as a necessary background was rather forced and has no bearing on the rest of the material. Métraux (1938, p. 238) says: "Mr. Hopkins, leading Chinese epigrapher, as Mr. Alan S. C. Ross kindly informed me, examined the Easter Island characters and failed to find any resemblance at all to old Chinese signs." Still less did any resemblance exist between the systems employed. The suggested root in China thus being purely speculative, it is very unlikely that Easter Island was the place where picture-writing was first invented and then exported to Panama and Mexico as a primary stimulus to all New World script.

Heine-Geldern (1938), in his paper on Easter Island script, summarises Hornbostel's arguments and supports his theory, but he also fails to find any convincing resemblance outside the same limited sphere of Easter Island and Panama. He writes (*Ibid.*, p. 884): "The Cunas to-day generally write on paper. But beside this, written wooden tablets also exist, and the Cunas say that these were the original writing material. The tablets seen by Nordenskiöld were intended to be hung up in the houses during celebrations. The ideograms are painted on with colours. However, according to information by D. L. Gasso cited by Nordenskiöld, the ideograms were formerly carved on wooden tablets. This recalls the written tablets of Easter Island. The writing in boustrophedon, too, and with the succession of lines running upwards from the bottom, recalls the Easter Island script. With the Cuna, however, the signs are always arranged the same way, not directed with the heads downwards in every second line as on Easter Island." Further (p. 885): "Although at first glance the written characters of the Cuna seem to differ completely in form from those of Easter Island, yet it appears to me that some quite important conformities may be established."

While arguing that a close examination shows remarkable analogies which tend to support Hornbostel's claim of relationship between the written tablets of the Cuna and Easter Islanders, Heine-Geldern is left with the impression "that the outer form of the Easter Island script has reached a considerably higher evolution than the Cuna script, or else—and this is probably the correct answer—that the Cuna script has to a greater extent become barbarized and sunk to a lower level than that of the Easter Islanders, although it may have maintained the original form of many written signs to a better degree. It appears from a statement by Nordenskiöld that the Cuna themselves are aware of the decline of their script: 'The picture-writing the Indians now have is not so good as the one they formerly had, was what *Nele* stated.' "[1] (*Ibid.*, pp. 883, 892.)

Hornbostel (1930, p. 953), who also compared the magic aim of the text that was cut in rising boustrophedon on the wooden tablets of Panama and Easter Island, states of the Cuna Indians that: "They cannot 'read' the script in the proper sense of the word, but merely sing the traditional text after it, which they know to be represented."

Heine-Geldern (1938, p. 884) also points to this peculiarity: "Precisely as was the case with the Easter Island script, so also among the Cuna it is necessary to know the text to be able to 'read' it, that is to recite it." Also (p. 885): "Just as among the Cuna, on Easter Island also written texts were recited at burials. Among the Cuna, the texts in question contained the description of the road to be taken by the departed spirit after death. A priest recites the text from a picture-writing, while the corpse is taken to the grave in a boat, thus showing the spirit the way, and instructing it in all that is to be encountered on the road. . . . We are unfortunately not informed as to the contents of the corresponding Easter Island texts, but it is of course very possible that they belonged to the same category as those of the Cuna. The accounts given to Mrs. Routledge by the natives of the burial of the Ariki Ngaara, who died in 1860, might perhaps indicate that the texts chiefly contained information for the spirits as to the journey after death: according to these accounts his corpse was carried to the grave on three written tablets, and these were buried with him." The author continues in a footnote: "I take the opportunity to call attention to a remarkable and perhaps not quite insignificant conformity in the burial rites of both domains, namely the use of feather sticks. 'For six days after his (Ngaara's) death,' says Mrs. Routledge in the passage mentioned, 'everyone worked at making the sticks with feathers on the top (*heu-heu*) and they were put all round the place.' Regarding these feather-sticks, it is said of the feather-god *Ere Nuku* in Thomson's *Apai* text, that he 'keeps off the evil spirit when feathers are planted over the burial-places.' Among the Cuna, four feather-sticks were placed together with the corpse in the grave, representing the symbol or the abode of four protective spirits that lead the souls on their pathway of death."

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[1] According to Néle, Cuna tradition attributes the invention of their picture-writing to a culture-hero named *Ibeórgun* who flourished some 800 years ago. The present writing was different from the original type: "The last one who knew how to draw the picture-writing proper was Memekina." (Néle in Nordenskiöld 1928, p. 17.)

The author also points out the frequent representation of feathers and feather-strings in both the Easter Island and the Cuna script. He shows how in these scripts one ideogram is often placed twice in direct succession, and he even demonstrates a few curious but noteworthy correspondences in the ideograms of the two regions. But, otherwise, samples of the present-day signs in Cuna and Easter Island picture-writing show utterly different artistic ability, morphology and style. Heine-Geldern's own conclusion (1938, p. 890) to his comparative study of these American-Oceanian scripts is: "All the correspondences here presented, when put together, may well justify the presumption that a relationship of some kind actually exists between the Easter Island writing and the writing of the Cuna." At the same time (*Ibid.*, p. 817) he emphasizes that: "All the information which Thomson and Mrs. Routledge obtained from the natives agrees in that the script arrived with Hotu Matua, and thus it did not come into existence on Easter Island."

These native statements were cited by Heine-Geldern to support his view that the art of writing was imported into Easter Island – and in his opinion from the antipodal Indus Valley by way of China. He overlooks the equally important part of the tradition, that Hotu Matua brought the written boards from the *east* when he ended his 120-day voyage in the trail of the setting sun (p. 211 above). Not only are we informed by tradition that Hotu Matua carried with him 67 written tablets from the barren semi-desert home of his ancestors, located to eastward, but we are even told that a certain Hinelilu, who came together with Hotu Matua in a separate boat with a "long-eared" crew, "was a man of intelligence, and wrote *rongo-rongo* on paper he brought with him." (Routledge 1919, pp. 279, 281.)

All told, we know that westward of Easter Island we must travel 9 000 miles before we find what is a completely different writing system in Old China, or also exactly half-way round the earth before finding at ancient Mohenjo-Daro a script that is barely comparable, not at all in writing method, or in place and time, but in the mere shapes of some selected figures. By far the nearest centres of script to Easter Island are the various prehistoric homes of picture-writing among the early American high-cultures. Only 3 000 miles away from the island, and on its windward side, aborigines in Southern Panama practised picture-writing on wooden tablets like those used on Easter Island; the ideograms were formerly cut in the wood as on that island, and the horizontal lines of incisions were in both cases arranged in boustrophedon that alternated from one side to the other while read from the bottom to the top of the tablets.[1] The ceremonial use of the written tablets, the texts of which were recited or chanted on special occasions, is a further correspondence. Beside all these basic conformities in idea, system, material and use, the differences to-day in style and symbol can have only secondary significance. The evolution of the art of picture-writing within the high-culture area of tropical America has resulted in a far greater differentiation between the various local scripts than is found between the signs, systems and working material of Panama and Easter Island.

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[1] That the undeciphered Easter Island tablets also are to be read from the bottom line and up may be judged from the quite inadequate space frequently left to the 'writer' when he came to his topmost line, where sometimes he had literally squeezed his last ideograms in by reducing their size. Such theories as strive to overcome the dilemma behind the origin of the Easter Island script by suggesting that it might be mere ornamental scribling, may certainly be dismissed as founded on other than facts.

Since we have no reason to go to lonely Easter Island in search of the origin of picture-writing in America, we must either shut our eyes to these correspondences, or else go to America for the origin of picture-writing on Easter Island. There is no good reason for overlooking the latter alternative.

It would be rather speculative to assume that the ancestors of the Cuna voyaged to Easter Island with some of their written tablets, or that the Easter Islanders had got the idea on a return visit to Panama. Certainly, there is no direct connection one way or the other between the Cuna Indians and the Easter Islanders, although a number of other analogies are also found between these two areas. If we assume a connection between their writing systems, we must look for a third people, that is, an instructor common to the ancestors of both peoples. The Cuna Indians and the Easter Islanders represent to a conspicuous degree the nearest marginal tribes north and west of the "empty space" formed by the presumably scriptless Andean high-cultures.

The question now naturally emerges: is it possible that the Easter Islanders may have acquired their pictographic system from some of the pre-Inca migrants in South America, whose ancestors originally passed through the Cuna territory on their southward trek to Peru? Or can we safely rule out this possibility because no form of writing is known to have existed in Inca Peru?

Father Cristoval de Molina, who was a master of the Quechua language and who, through his position in the hospital for natives at Cuzco, was intimately acquainted with Inca chiefs and learned men of the pre-Conquest generation, made brief mention of an Inca method of memorizing events (1570-84, p. 4): "And first with regard to their idolatries, it is so that those people had no knowledge of writing. But in a house of the Sun called Poquen-Cançha, which is near Cuzco, they had the life of each one of the Yncas, with the land they conquered, painted with figures on certain boards, and also their origin." There can be no doubt that the figures painted on the boards were some rather primitive or elementary form of pictographs, since the same authority gives some of the texts in question, and these included long and intricate myths which could hardly have been told on boards unless by means of some primitive form of picture-writing. "Among these paintings the following fable was represented," says Molina, whereupon he enters upon a long account of how all people and created things had once perished in a deluge, while the survivors who saved their life in a drifting "box" were commanded by the Creator to settle as *mitimas* (colonists) in Tiahuanaco, where the Creator had his own chief abode, and where he had first raised up people and nations in darkness, until he finally put an end to the permanent night by making the sun and celestial bodies ascend to the sky from Titicaca Island. We even learn that the painted boards narrated such details of conversation as the commandments given by the sun to the first Inca Manco Capac while it rose into the sky.

Several writers who have subsequently quoted Molina's early Inca creation stories, for example Bandelier (1910, p. 312), have also commented that: "In the first place it is interesting to note that Molina refers to 'figures on certain boards' as his principal source for the above tales." As is well known, a similar reference is made by Sarmiento (1572, p. 200), who otherwise, in his famous local history, had little praise for the intellect and cultural standing of the Inca. He wrote with reference to the 42 learned Inca historians he had assembled at Cuzco: "They heard their fathers and ancestors say that Pachacuti Inca Yupanqui, the ninth Inca, had verified the history of the former Incas who were before him, and painted their deeds on boards, whence also they had been able to learn the sayings of their fathers, and had passed them on to their children." Sarmiento further wrote:[1] "There connects with this the great investigation of Pachacuti Inga Yupanqui, ninth Inga, who issued a general call to all the old historians of all the provinces he subjected, and even of many others more from all those kingdoms, and he kept them in the city of Cuzco for a long time, examining them concerning the antiquities, origin and notable facts of their ancestors of those kingdoms. And after he had well ascertained the most notable of their ancient histories he had it all painted after its order on large boards, and he placed them in a big hall in the house of the sun, where the said boards, which were garnished with gold, would be like our libraries, and he appointed learned men who could understand and explain them. And nobody could enter where those boards were, except the Inga, or the historians, without express licence from the Inga."

The references by both Molina and Sarmiento to Inca texts preserved in the House of the Sun by means of figures painted on large boards strengthen the case for the existence of at least a vaguely developed local system of picture-writing. These references are not likely to be concoctions made to suit the purpose of either of these two independent chroniclers. There is evidence, therefore, of ideographic recording on wooden tablets or boards in Peru also—a system either invented by the Inca, or heard of from an older local source.

Montesinos' reference to the practice of writing in pre-Inca Peru

The genealogy and history of kings and customs in Peru in the long culture-period that preceded the rule of the twelve Inca generations were recorded only by two of the early chroniclers, namely Blas Valera and Fernando Montesinos.[2] As Father Montesinos made some remarkable statements regarding the existence of writing in pre-Inca Peru, we shall first have to analyse the authenticity of his information. Montesinos was a Jesuit who came to America in 1628, and went the same year or the next to Peru, where he was first Secretary to the Bishop of Trujillo and Rector of the Seminary. (See Markham 1920; Means 1920 a.) He was later a "Visitador" twice, and explored all parts of Peru, travelling some 1 500 Spanish leagues (close on 6 000 miles) in the discharge of his office, and devoting himself especially to mining and historical researches. As Means (*Ibid.*, p. xiv) states: "He doubtless learned some of the native languages, and his work was of a nature to keep him in close touch with the natives. It is quite certain that Montesinos either saw and copied the original manuscript of Valera's *Vocabulario* (then at La Paz) or a copy of it, and it is equally plain from evidence recently adduced that he had access to various works by Jesuits and other writers."

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[1] 1572 b, English translation by Bandelier (1910, p. 313).

[2] As shown by Markham (1920, p. 5) and Means (1920 a, p. xviii), a mere reference to the existence and names of certain kings in the pre-Inca genealogy is found also in some other chronicles. Thus Means (*Ibid.*) writes: "It is worthy of note, also, that Bartolomé de las Casas, who was in Peru in 1532, just after the Conquest and long before the birth of Blas Valera, makes the definite statement that other dynasties of chiefs ruled in the Andes before ever the Incas rose to power."

In his work on early historic memories of Peru Father Montesinos (1642) took at least two false steps which have caused him to receive more abuse from later critics than he probably deserves. He attempted at the opening of his work briefly to link the early Peruvian account of Viracocha's flood with the Biblical description of Noah, thus purposely mixing his own belief and theory with the quoted Inca text. Later he copied freely, without acknowledgement, the information contained in the various Jesuit archives to which he had access. Like the two leading authorities on Inca history, Markham (1920) and Means (1920 a), who have analysed the value of Father Montesinos' work in their respective introductions to its English translation, we may well forgive Montesinos this act of piracy, seeing that it has at least preserved for us priceless information that would otherwise have been lost with Blas Valeras' original manuscript. For both Markham and Means consider Montesinos a mouthpiece of the principal mestizo historian Blas Valera, and they devote much space to the latter in their evaluation of Montesinos' statements.

Father Blas Valera was born in Chachapoyas, Peru, in 1539 or 1540. His native mother had been connected with the Inca court before the arrival of the Spaniards, and she brought him up in Cajamarca, the favoured Inca residence, when this place was still full of memories of the original history of the country. One manuscript of Blas Valera was partly destroyed in the sack of Cadiz in 1596, and what was saved was given to Inca Garcilasso, who used Valera as a principal source. Probably his most important manuscript was the *Vocabulario histórico del Perú*, which contained not only the genealogical list of the Incas, but even a long genealogical line of a pre-Inca dynasty in Peru. This was taken from Cadiz to La Paz by a Procurador of the Jesuits in 1604, and it was studied and copied by Montesinos, at least in part, before it was completely lost. Against this background Markham (1920, pp. 7-9) concludes, in his analysis of Montesinos' authenticity:

"Blas Valera had qualifications and advantages possessed by no other writer. Garcilasso knew Quichua, but he was a child and only 20 when he went to Spain, and it was after an interval of forty years that he thought of writing about his native country. Blas Valera, like Garcilasso, was a half Peruvian, and Quichua was his native language. But, unlike Garcilasso, instead of going to Spain when he was 20, he worked for Peru and its people for thirty years, devoting himself to a study of the history, literature, and ancient customs of his countrymen, receiving their records and legends from the older Amautas and Quipucamayocs who could remember the Inca rule, and their lists of Kings, and possessing a perfect mastery of the language. ... A preliminary discussion of the author was necessary, before proceeding to examine this important list of ancient Peruvian Kings compiled by Blas Valera, a most competent expert, from the records of the Amautas and Quipucamayocs who were living before the Spanish Conquest. ... The list of [Montesinos'] Peruvian Kings is thus found to be authentic to the extent of having been made by Blas Valera, the best of all the authorities, from the ancient *quipu* records expounded by Amautas and Quipucamayocs, who had charge of those records previous to the Spanish Conquest. This origin certainly gives importance to the list, and entitles it to serious consideration."

And Means (1920 a, p. XV) concludes :"Therefore, in spite of the fact that the *Memorias Historiales* are blemished by a vulgar credulity on the part of their author that is truly astonishing, and in spite of the fact that much of what they now contain is obviously apocryphal, it is impossible to regard the *Memorias* in any other light than as the mutilated form of the perfectly sound *Vocabulario histórico* of Valera. Montesinos, therefore, is one of the most important of the earlier writers on Peru. His excellence, however, such as it is, comes not from anything which he has contributed himself to our knowledge, but to what he has preserved to us of Valera. On this account, Montesinos (representing Valera) is the chief, and indeed the only, historian yet published who touches upon the pre-Inca history of Peru." Further (*Ibid.*, p. xxvii): "... it is interesting to observe what Montesinos has to say, in Chapter XIV, about the former existence of some sort of writing in ancient Peru. It is conceivable that there was such a thing, but it is by no means conclusively proved as yet."

Montesinos (copying Valera) gives the individual names of 90 generations of kings who were supposed to have ruled in the Andes before the 12 generations of the Incas. With an average of 25 years to a generation, this would take us back to about 1000 B. C., a ridiculous period to the mind of most Peruvian historians until a few years ago, but quite conceivable in the light of recent Carbon 14 testings.[1] Of the life of a certain king named Sinchi Cozque Pachacuti I, number four from the beginning of the genealogy of pre-Inca kings, Montesinos (1642, p. 18) writes:

"The amautas, who know the events of those times by very ancient traditions passed from hand to hand, say that when this prince was reigning there were letters, and also men very wise in them whom they call *amautas*, and that these men taught reading and writing. The principal science was astrology; as far as I am able to learn they wrote on the leaves of the plantain-tree which they dried and then wrote upon, ... And in Chile, when paper for his *Araucana* was lacking to D. Alonso de Arcila, an Indian filled the need with leaves of the plantain-tree, and on them he wrote great portions of his poem, as the padre Acosta says. Also they wrote on stones. A Spaniard found among the buildings of Quinoa, three leagues from Buamanga, a stone with some character which no one could understand. And thinking that the memory of the *guaca* [*huaca* or *waka* = sacred shrine] was written there, he kept the stone for the sake of understanding it better. These letters were lost to the Peruvians through an event which befell in the time of Pachacuti Sixth, as we shall see in the proper place."

From the life story of *Inti Capac*, an outstanding king appearing as number five in the genealogy of the earliest pre-Inca dynasty, we read in Montesinos (*Ibid.*, p. 32): "For the sake of good intercommunication, he commanded that there should be post-runners along the roads, whom we call chasquis. The arrangement was that, at each league, which is equal to two Spanish leagues, there should be two or three huts in which there were to be as many men, continually on a sharp lookout. These houses were placed close to the highway, and the men were relieved each month, because one of them kept watch and the other two ran with the messages, one in one direction and one in the other, and without stopping an instant they returned to their posts; ... When they had letters and figures or hieroglyphs they wrote on the leaves of the plantain-tree, as we have said, and one chasqui would give the folded leaf to the next until it arrived in the hands of the king or of the governor. After they lost the use of letters, the chasquis passed the verbal message from one to another, and they learned them very well, so that in this way the message came to him for whom it was intended."

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[1] In fact both the radio-carbon datings and Montesinos-Valera's list of Peruvian kings take us quite a few centuries beyond 1000 B. C., since Montesinos claims that a few centuries of chaos intervened between some of the memorized Peruvian dynasties.

In the reign of Titu Yupanqui Pachacuti V, the sixty-second king in Montesinos' list of pre-Inca monarchs, we are informed that fierce invading armies attacked the early Peruvian monarchy, overthrew the local government and inflicted catastrophe upon the existing dynasty. Montesinos (*Ibid.*, p. 58) writes: "And because in this time great armies of very fierce people came, as well by way of the Andes as by way of Brazil and Tierra Firme, they had great wars in which they lost the letters which had lasted up to that time." And (p. 62): "Thus was the government of the Peruvian monarchy lost and destroyed. It did not come to its own for four hundred years, and the knowledge of letters was lost."

We can do no more than render these statements as they were written by Father Montesinos. If the source of his statements on writing in ancient Peru is the same as his source for the pre-Inca genealogical line—Blas Valera—then the value of this information is quite apparent. It is not easy to believe that Father Montesinos simply invented the whole story, in view of the abundant information to which he had otherwise free access in the early Jesuit archives and among the native Peruvians. Means (*Ibid.*, p. 35) comments in a footnote to his translation of Montesinos: "The question of whether or not there was anything resembling hieroglyphics in pre-Incaic Peru is an important one, but one which has never been settled. Without at all accepting in a literal sense the theories of Posnansky and others, one may say that there are certain details in the artifacts of pre-Incaic Peru which seem to suggest that some system of mnemonics, if not of actual hieroglyphics, formerly prevailed. On the great gateway at Tiahuanaco, on the vases from various coast sites, in various rock-carvings here and there, and especially on the famous golden breastplate and *topu* described by Markham...one sees many conventional and stylistic figures and marks which may have had the function of writing. More than this, the cautious student hesitates to say at present."

Many of the purely ideographic symbols in pre-Inca art, in the highland as well as on the coast, are as highly developed as any hieroglyphic sign, yet they have apparently come down to us only as ornamental patterns on stone statues or vases, or they are woven into ancient fabrics. It is therefore interesting to draw a parallel between the past and present in Peru. Nordenskiöld (1930, p. 107) writes: "The Aymara occasionally use European alphabetical letters as ornaments on their fabrics. So far as I have seen they are not arranged into words." The great step in the evolution of script is to conceive the idea that writing and reading can be done. The selection of symbols is an easier matter. Like art and design can vary markedly between closely related tribes, so can also the signs selected for picture-writing be recast and designed for strictly tribal use. Also here historic Peru offers an interesting example. Thus Nordenskiöld (*Ibid.*) continues: "These Indians have also in post-Columbian times invented a picture script. It is said to have been composed by an Indian of Sampaya, on Lake Titicaca. This picture writing depicts the Commandments, the Sacraments, etc. This Indian was unable to read or write ordinary script. He did not employ our letters or figures, but pure picture-writing which he must entirely have composed himself. I cannot but be supposed that he received the idea of the whole thing from seeing the white men's script and its use. This genial invention appears to have lived on in that locality for the space of a generation or two and then been forgotten." Whether this Titicaca Indian was inspired by some vague traditional memories of real picture-writing, or whether he got the idea from the entirely unrelated phonetic characters used by the Spaniards, it should in any case afford material for reflection.

Of recent years Ibarra Grasso (1948) has published a monograph on the indigenous Andean script. He presents a rich material on picture-writing found among post-Columbian Aymara and Quechua tribes (pp. 9—124), and in defence of a pre-Columbian origin of the idea, he gives an example of boustrophedon and draws a parallel with the Cuna writing system. (*Ibid.*, p. 117.) A written stone tablet from the Andes with ideograms placed in two lines shows the second line to continue in boustrophedon and simultaneously upside-down as on the Easter Island tablets.

The early Chimu Beans

We know to-day with certainty that at least one of the early pre-Inca cultures on the north coast must have had a peculiar ideographic system of its own, subsequently lost among later local cultures. As Hoyle (1946, p. 175) first pointed out: "The Mochicas had an ideographic system. Beans were indented with straight, curved, broken, and parallel lines, points, circles, crosses, etc. in kidney-shaped spaces. Many beans repeat the same design as if conventional meaning were intended. These beans were carried in bags by messengers, like the Inca runners, travelling over roads. ... This ideographic system spread throughout ancient Peru, reniform ideograms (inspired by the lima bean) being found on textiles and ceramics of the Paracas, Nazca, Tiahuanaco, and Lambayeque cultures." The same author shows how Early Chimu pictorial representations of certain anthropomorphic animals symbolize the running messengers, whereas others, generally anthropomorphic foxes and felines, symbolize the interpreters and scribes. He maintains on his own accord to have found "numerous analogies between the Peruvian and Mayan ideographic systems."

The Motilone picture-writing

Recently a new discovery of a rudimentary picture-writing in South America was announced at the last International Congress of Americanists in New York. Reporting on this meeting in his paper "Cultural Connections between Asia and pre-Columbian America", Heine-Geldern (1950 a, p. 352) writes: "Although not directly concerned with Old and New World relations, the lecture delivered by Professor José M. Cruxent, Director of the Museum in Caracas, Venezuela, should be mentioned in this context because of its far reaching implications. Dr. Cruxent announced the discovery, among the Motilones Indians of western Venezuela, of a system of picture-writing which in general character, as well as in details, so closely resembles the picture-writing of the Cuna Indians of eastern Panama and the script of Easter Island that the existence of some kind of connection can hardly be doubted."

In anticipation of the appearance of Cruxent's own paper in the forthcoming official report on the Congress, the author has generously informed me on the subject by personal communication:[1] The Motilone Indians of Venezuela, he says, possess a system of pictorial communication equivalent to actual writing. These Indians inhabit the vicinity of the Sierra de Perijá, a few hundred miles from the Cuna territory of Southern Panama, and next to the border of Colombia. The picture-writing is locally referred to either as *tiot-tio* or as *ojemaitopo.* In the "normal form", the sender of a message draws his signs upon a piece of cloth or paper; then he chants the text to the messenger while pointing with his finger to the signs. The messenger does the same before he departs, and when he later reaches the destinee, he again begins to chant in the same manner and thus communicates the content of the pictographs. In the "ceremonial form" the written message is painted on certain sticks. A group of natives visiting a neighbouring village proceeds very slowly in ceremonial order, carrying sticks with painted signs. When they come within hearing distance, the carriers of the written sticks begin to point to the signs and chant their message. In the opinion of Cruxent and his colleagues, some of the signs in the mnemotechnical writing of the Motilone Indians occasionally resemble petroglyphs current in that area. Cruxent writes (*Ibid.*) : "It is evident that the *tiot-tio* has already entered a stage of transculturation, but there is no doubt as to its being entirely of native origin. It seems curious that the manner of reading the *tiot-tio*, and some of the signs thereof, remind us of the Rapanui tablets of Easter Island."[1]

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[1] Professor J. M. Cruxent, Director *Museo de Ciencias Naturales*, Caracas, letter to the author dated May 13, 1950.

The quipu or knotted string record

The fact that it was possible, at the advent of the Europeans, for the Inca to organize and govern a whole empire without the general use of a writing system, may be part due to the local ability, maintained by constant practice, to memorize oral instructions and lessons verbatim. As stated by many writers, the exceedingly high development of the use of *quipus* in Inca Peru may also have lessened the need for a regular writing system such as was in use among the Mayas and other early Mexican high-culture peoples.

The elaborate Peruvian *quipu* seems to be a locally developed improvement of the more primitive system prevailing in many parts of the world, where days are counted by means of an equivalent number of knots tied along a simple string. This primitive system had a wide distribution in the Americas (see Nordenskiöld 1930, p. 214, map 3), and occurs as well in China and adjoining sections of the Old World. But in ancient Peru, already before the Inca period, this basic idea had developed into a specialized culture element: the true quipu. (Hispanized spelling of the Ouechua *kipo*, "knot".) Joyce (1912, p. 102) writes of this local mnemonic device: "These quipus were cords on which were made knots of almost infinite multiplicity. For the purposes of reckoning, each form of knot represented a different number, and each string a different subject; to some of the strings, subordinate strings were attached, serving as footnotes, and the strings forming one set of accounts were arranged as a fringe along a master-string. An indication of the nature of the objects enumerated was furnished by the colour of each string, and the combinations of colours and types of knots gave an almost endless variety to the uses to which this method of recording could be put. It is even said that events were recorded by means of the quipus, and the statement is not incredible, since the system was in the hands of professional accountants, *Quipucamayoc*, who gave their whole lives to its study and elaboration."

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[1] Pachacuti (1620 b, p. 291) recalls how Inca Tupac Yupanqui dispatched a principal supervisor to his lands and fields, giving him his commision in the form of lines on painted sticks (*en rayas de palo pintado*). Both Rowe (1946, p. 326) and Bennett (1949 b, p. 613) mention "painted sticks" in use among the Inca as a mnemonic device. Bennett (*Ibid.*) writes: "The *Inca* used painted sticks as a memory-supplement, in which the association with a particular color band was important."

In historic Polynesia writing was as unknown as in Inca Peru, although also here a few ideograms of both symbolic and ornamental nature were used in the art of some of the islands. On the other hand, Best (1921 b, p. 67) writes: "It is not generally known that knotted cords were employed by the Polynesians in pre-European days for the purpose of recording tallies, as in the Hawaiian Isles, and also, according to Maori tradition, for sending messages. . . . At the Hawaiian Islands these knotted cords seem to have been employed much as they were in Peru. Thus in Tyerman and Bennet's Journal we read that 'The tax-gatherers, although they can neither read nor write, keep very exact accounts of all the articles of all kinds collected from the inhabitants throughout the island. This is done principally by one man, and the register is nothing more than a line of cordage, from four to five hundred fathoms in length. Distinct portions of this are allotted to the various districts, which are known one from another by knots, loops, and tufts of different shapes, sizes, and colours. Each taxpayer in the district has his part in the string, and the number of dollars, hogs, dogs, pieces of sandalwood, quantity of *taro*, &c., at which he is rated is well defined by means of marks of the above kinds most ingeniously diversified.' "

Many writers have briefly dwelt with the same subject, and commented, like Brown (1924, p. 264): "There is one more feature of Peruvian culture that is widespread in Polynesia and Micronesia; it is the Inca quipu, or system of knotted cords for remembering facts and especially numbers." Also (*Ibid.*, p. 83): "That the quipu was used in the Society group centuries before Pomare moulded it into an empire points back to the Polynesian fatherland as its source."

Turner (1861) writes in his work on Samoa: "Tying a number of knots on a piece of cord was a common way of noting and remembering things, in the absence of a written language, among these South-Sea-Islanders." Friederici (1929, p. 469) says that a "strong conformity" has been established between the knotted cords or quipus of the Inca-Peruvians and those of the Polynesian aborigines of the Marquesas Group, Hawaii, and Rarotonga. And Degener (1949, p. 195) writes: "The Maori with their *tauponapona* and the Peruvians with their *quipu* both used the knotted string as a method of keeping records. It is very probable that restless Indians migrated in prehistoric times from South America to the Easter and Tuamotu Islands."[1] The antiquity of the system among the Polynesian ancestry is indicated by its wide local spread, and by Maori tradition. Best (1921 b, p. 68) writes: "The Maori of New Zealand has preserved in tradition the knowledge of a former use of the *quipu* among his ancestors. ... The most interesting feature of the tradition is that distinct statements are made to the effect that messages were transmitted by means of knotted cords that needed no explanation. This could only have been accomplished by assigning an arbitrary meaning to certain arrangements of knots, and, necessarily, the scope of such a system would be by no means a wide one. Certain sentences, queries, remarks, &c., would be represented by different combinations of knots, and such a usage would endow them with a symbolical meaning." To illustrate the early usage of the system among the Maori ancestry, Best (*Ibid.*) renders a tradition of Turahui, uncle of Whatonga, who landed in the isle of Rangiatea when the gale broke up the famous canoe race at Hawaiki about seven hundred years ago. (See Part III.) Turahui's mother went to the *tohunga* (priestly experts) of Hawaiki and asked them to send Te Kawa in search of her son. This was a tame bird, a *wharauroa* or "far-travelled" one, which belonged to her son, and it was requested that the bird should bear a message to its master. This was done by a *tau ponapona*, or "many-knotted cord" which was so manipulated as to represent the words "Is it well with you? Where are you abiding?" The knotted cord was then attached to the neck of Te Kawa, and the bird was taken to the *tu-ahu*, a sacred place where ritual ceremonies were performed, and there released for its long-questing flight. We are told that the legendary bird succeeded in locating its master, and "the knotted cord was taken from its neck and the message read off. All the castaways assembled to great Te Kawa, and it was resolved to send the bird back with a return message as follows: 'We are all well; we are at Rangiatea.' " Soon after this occurence the castaways set forth to return to Hawaiki, but on the way they encountered the bird which came to them with a new knotted cord arranged to ask "whether or not the party was returning home." Again a confirmative *tau ponapona* was knotted and sent with Te Kawa, and soon after the voyagers were safe home. Best stresses that this tradition "is firmly believed by the Maori, and that it at least proves his knowledge of a former use in Polynesia of the *quipus*."

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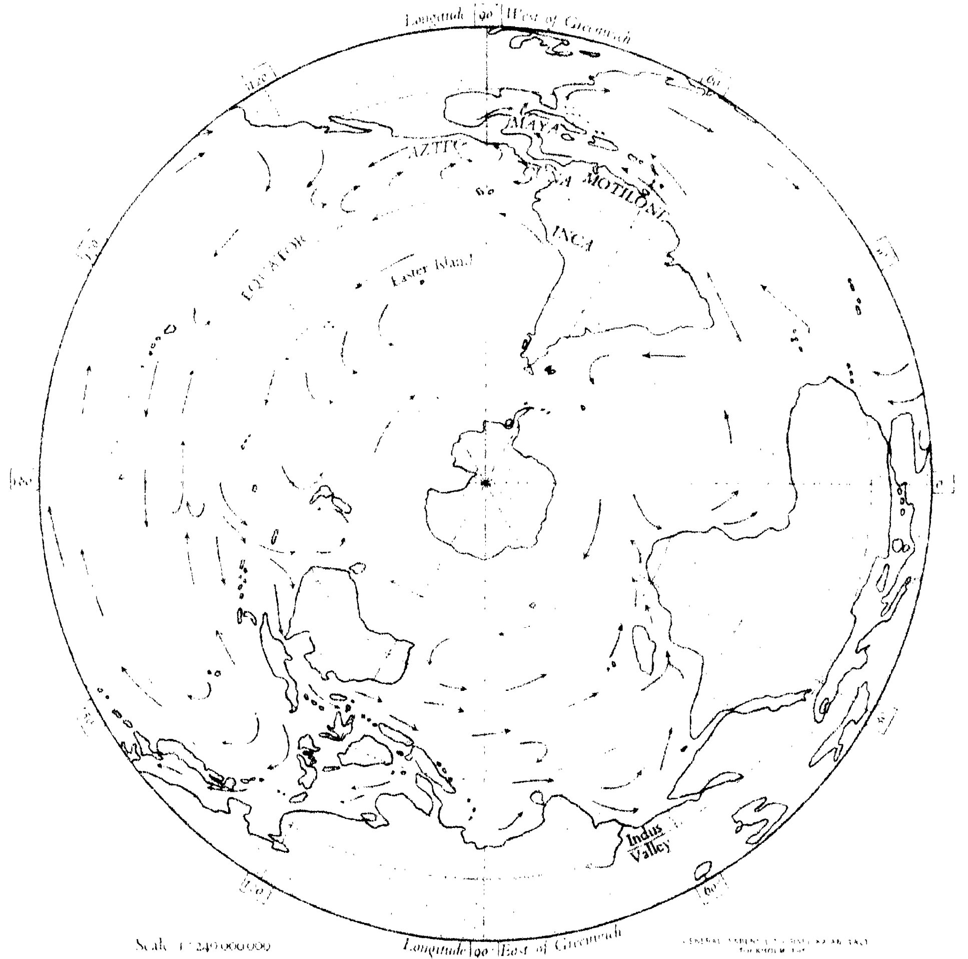
[1] Degener does not go further into this migration theory, but merely writes (*Ibid.*, p. 194): "What about the frequent cropping out of a blond strain in Polynesia, members of which are called *ehu* in Hawaii? Were some of the ancestors of the Polynesians blond Nordics? Granting that many intriguing details regarding the peopling of the Pacific remain to be solved, we have oriented, as the map... shows, the Micronesians to the north-west, the Melanesians to the south-west, and the Polynesians to the east. The Mongoloids early drifted into the New World, using the Aleutian Islands as stepping stones. Once there, they fanned out over the continent to develop into numerous nations and tribes of Amerindians, some highly cultured. I believe the Pacific Islanders and the Amerindians had some intercourse with one another across the Pacific." Also (*Ibid.*, p. 195): "Various authorities presume to recognize relationship of Pacific Islanders and Amerindians... Even though some of this evidence may be disproved by future research, the sum total supports the relief that Pacific Islanders and American Indians had intercourse with one another."

The same author (*Ibid.*) also points out that the Maori has "a curious and interesting word embedded in his language. That word is *pona*, the ordinary meaning of which is a knot, but it is also employed as denoting a message or behest. The Maori has two expressions to define the *quipu*—viz., *aho ponapona* and *tau ponapona*—both of which mean 'many-knotted cord.' "

As usual, opinions on the analogical use of knotted string records in Peru and Polynesia are divided. Emory (1942 b, p. 131) writes of this custom in his criticism of Nordenskiöld's list of "Oceanian" culture elements in South America: "What they have in common is simply tying knots to record numbers." Feeling that with this simplification he has reduced the analogies to a fairly general level, the author points out that such a natural and simple system is also found among the Bontok of the Philippines, who "tied knots in a string to keep track of days passed."

Carter (1950, p. 180) is of quite the opposite opinion. He considers the "Quipus common to Polynesia and Peru" as of "highly specific and very complex traits." If we look at the string records of plate LXXXVIII and LXXXIX, we may probably agree with Carter hat we are dealing with a rather peculiar and rare culture element which reached itst

EASTER ISLAND- INDUS VALLEY



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climax in Inca Peru, but which even in parts of Polynesia appears in a very specific and complex form.

Linton (1923, p. 444) states: "String records were used to keep record of taxes in Hawaii, of songs in the Cook group, and of genealogies in New Zealand." Also (*Ibid.*, p. 443): "The use of string records seems to have been more highly developed in the Marquesas than in any other part of Polynesia. Such records served principally to aid the memory in the recitation of chants and genealogies, but Stewart (1831) mentions a time record consisting of a string of tapa on which a knot was tied at the return of every full moon."

That astronomical observations are knotted into some of the Peruvian string records also is shown by Nordenskiöld in his papers "Calculations with years and months in the Peruvian Quipus" (1925 b) and "The Secret of the Peruvian Quipus" (1925 a). Otherwise we know from early *quipucamayocs* or quipu experts in historic Peru that the local string records, as in the respective islands of Polynesia, were used to record genealogies, ancient chants and memories, and to keep track of the taxes due to the ruling hierarch, just as in Hawaii.

Linton (1923, p. 444) further shows from the preserved Marquesas Island specimens that the knotted strings, some of which are branched and of various lengths, are fastened to some sort of a body which may vary greatly in shape, from cylinder- or almond-form to the shape of a small bag with the knotted strings attached to its edge. During my visit to Hivaoa Island in the Marquesas Group in 1937 an old woman still possessed her own ancestors' genealogical record, consisting of a variety of knotted strings of coconut-fibre attached to a fish-shaped base. The other natives greatly admired the intricate heirloom, but they did not know how to interpret or extract information from the system, nor was the old woman willing to dispose of her treasure or her secrets. Linton (*Ibid.*, p. 443) also says: "These string records, according to Von den Steinen, were purely mnemonic and could only be interpreted by the maker or by one whom he had instructed. They were used to record genealogies, and also as an aid in chants of a religious nature. Records of both sorts were sometimes attached to a single body." And, again quoting Von den Steinen, he writes (*Ibid.*, p. 444): "Another record is very elaborate. It has a short body, covered with white tapa and decorated with plaited coconut leaves and bunches of midribs of coconut leaflets. To this are attached seven cords for songs and twelve for *mata*. All of these were recited in regular order. Still other small records, ... were used to instruct chiefs' children in chants."

It is interesting to note that the Marquesas Island word for "genealogy" is *orongo* (or *o'ono*), when we again recall that the Easter Island word for script is *rongo-rongo*, and that Rongo was the early Polynesian deity for whom Cook was mistaken in Hawaii and Beechey in Mangareva.[1]

The mere fact that some of the Marquesas Island string-systems represent genealogies which are kept up to date by growing generations, and yet go back as far as the whole local history, is good enough evidence that the system was imported and not recently contrived. Indeed, we need not suspect relationship between all peoples who merely tie knots to strings. It is different in a case when peculiar culture elements, such as those illustrated in plates LXXXVIII and LXXXIX are not separated by land or sea — but *united* by a direct current that can carry people along in one direction in a matter of weeks.[1]

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[1] Another Marquesan term for the genealogies is *mata*. Enock (1912, p. 227) compares the Peruvian term *quipu* (Quechua: *kipo* = knot) with the Tahitian word *tipona* for the same mnemonic device. Compare Maori *pona* and *tau ponapona*.

Schools

Rowe shows (1946, p. 282) with Garcilasso, who quotes Blas Valera, and Morúa, that lessons in the use of quipus, and instruction in warfare, history, religion and the Quechua language, were given in Cuzco to the sons of the nobility and of provincial officials. Joyce (1912, p. 116) compares these pre-European schools in Peru with the aboriginal *whare-kura*, or sacred House of Learning, among the Maori. About the latter White (1889, p. 8) writes: "Whare-Kura, the sacred school in which the sons of high priests were taught our mythology and history, stood facing the East, in the precincts of the sacred place of Mua." According to Buck (1926 a, pp. 183, 185), a Sacred House of Learning (*Whare Wananga*) was built by learned men in the very first party that landed on the island, and the tradition was carefully maintained. "The later schools," he writes, "were not so much a separate house specially built as they were courses of instruction taught in a house rendered *tapu*, or sacred, for the occasion. The sons of chiefs and priests were selected for instruction."

In Polynesia vestiges of a school system seem to have survived only in the Marquesas Group, and more especially in Easter Island, where we again meet the idea of an organized school. Métraux (1940, p. 390) writes from this island: "As already mentioned the chants associated with the tablets were recited by learned men or bards called *tangata rongorongo*. Reading of the tablets or chanting from them was taught in special huts, comparable to the schools of learning (*whare wananga*) of the Maori. At Hara-titaha in Anakena I was shown stone curbs which were supposed to be remains of the most famous school for *rongorongo* men. There were similar houses in other districts."

It was probably due to these organized schools that the Maori of New Zealand and the Easter Islanders had preserved such an extraordinary rich and detailed supply of traditions concerning the earliest arrival of local voyagers and landing-parties.

Astronomy and the calendar system

The astronomical knowledge of some of the aboriginal Polynesian tribes was so pronounced as to approach the nature of true science, and thus represent an outstanding feature in the local cultures. In his *Astronomical Knowledge of the Maori*, Best (1922) lists approximately two hundred different names applied by the Maori to various stars, and he says with Banks (1896, p. 162): "In their longer voyages they steer in the day by the sun, and in the night by the stars: of these they know a very large number by name, and the cleverest among them will tell in what part of the heavens they are to be seen in any month when they are above the horizon. They know also their time of annual appearance and disappearance to a great nicety, far greater than would be easily believed by an European astronomer."

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[1] Without implying any connection whatsoever with the knotted string records discussed above, we may merely call attention also to the well-known string figures which have an almost world-wide distribution among aboriginal peoples. Haddon, in an introduction to Jayne's monograph on string figures (quoted by Andersen 1921, p. 85), came to the conclusion that "it seems that they fall into two mains groups." He found the one group to belong to Europe and Asia, and proposed to designate this type as 'Asiatic' to distinguish it from the other group which belonged to America and Oceania, and which he proposed to term to the 'Oceanic' type. Andersen (*Ibid.*, p. 199, fig. 27) describes and illustrates a very complicated Maori string figure, the *moutohora*, which required two performers and two strings. Precisely the same figure was recorded and illustrated from Micronesia (fig. 28: the Carolines) and America (fig. 29: New Mexico). Bengt Danielsson writes me as follows on the subject of string figures (letter Sept. 6, 1950): "...the *technique* employed in making them is the same in America and Polynesia, whereas in Asia, Europe and Africa it is different. Extremely few figures have proved to be common to Polynesia and America, but on the other hand there are still fewer that are common to Polynesia on one side and Asia-Europe-Africa on the other."

The ancient Hawaiians possessed a corresponding astronomical knowledge. King (1925, p. 13) states: "They distinguished between the navigational stars, *na hoku hookele* and the planets, *na hoku hele* or moving stars, of which they knew five." Fornander (1878, Vol. I, p. 127) shows from another Hawaiian dialect that the planets Mercury, Venus, Mars, Jupiter and Saturn each had their distinct names but were unitedly known as *na hoku aea*, "the wandering stars," in contradistinction to all the others which were *na hoku paa*, "fixed stars." He quotes Dibble regarding one of the early Hawaiian astronomers (*Ibid.*): "Hoapili was so much in the habit of observing these [the 5 planets] that he could at any moment tell the position of each; . . . he had heard from others that there was one more travelling star, but he had never recognized it, and was acquainted with only these five. The more distinguished fixed stars and clusters had their distinct names, and the people were in the habit of observing them so much, that they judged of the hour of the night about as accurately as of the hour of the day."

Fornander (*Ibid.*) also shows how the solstices were observed and named in certain parts of Polynesia, and he shows that in ancient Hawaii both the limits of the ecliptic and the situation of the equator were familiar subjects to the local sages. The equator was known under the poetical name *ke Ala i ka Piko a Wakea*, "the Road to the Navel of Wakea," that is to say: the road to the navel (or birth-place) of Light. The northern tropic was *ke Ala-nui polohiwa a Kane*, "The black shining Road of Kane," whereas the southern tropic was *ke Ala-nui polohiwa a Kanaloa*, "the black shining Road of Kanaloa." Fornander adds: "Whatever the origin of these names, and the knowledge which underlies them, they certainly owe nothing to Malay instruction."

Directly connected with the astronomical knowledge were the fully developed calendar systems in use on several of the Polynesian islands. "The principal Polynesian groups," writes Fornander (*Ibid.*, p. 124), "had not only names for year, month, and seasons, but had also distinct names for every month and every day in a month. Nor are these names of Malay origin."[1] Also (*Ibid.*, p. 118): "The Polynesians divided the year into seasons, months, and days. The seasons—*Tau* or *Kau*—of the year were generally two, . . . The commencement of the seasons, however, were regulated by the rising of the *Makarii* stars, the Pleiades, at the time of the setting of the sun. Thus, in the Society group, the year was divided into *Makarii-i-nia*, Pleiades above the horizon, and *Makarii-i-raro*, Pleiades below—the first from November to May, the latter from May to November. ... In regard to the division of the year by months, the Polynesians counted by twelve and by thirteen months, the former obtaining in the Tonga, Samoan, and Hawaiian groups, the latter in the Marquesas and Society groups. Each month consisted of thirty days. It is known that the Hawaiians, who counted twelve months of thirty days each, intercalated five days at the end of the month *Welehu*, about the 20th December, which were tabu-days, dedicated to the festival of the god *Lono* [*Rongo*], after which the New Year began with the first day of the month *Makalii* [Pleiades], which day, being the first of the year, was called *Maka-hiki* (equivalent to 'commencement day'), and afterwards became the conventional term for a year in the Hawaiian, Marquesas, and Society groups."

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[1] Fornander, it will be recalled, disregards Malaysia and the Philippines as a possible Polynesian Fatherland, and tries to locate it in Arabia. He believes that the ancient computation of time among the aboriginal Polynesians "will go far to confirm the western origin of the Polynesians, and their intimate connection in pre-historic times with the Arian and Cushite peoples." (*Ibid.*, p. 123.) We recall again the map opposite page 640, and the geographical layout ignored by so many diffusionists.—It is interesting to note that Fornander obtained most of his information on the aboriginal Hawaiian conceptions of time reckoning from Kamakau (*Ibid.*, p. 123), "an intelligent and educated Hawaiian, born and brought up while the heathen regime still prevailed."

Fornander continues by quoting Dibble concerning early Hawaii: "Those who took the most care in measuring time measured it by means both of the moon and the fixed stars. They divided the year into twelve months, and each month into thirty days. They had a distinct name for each of the days of the month, as has been shown on a former page, and commenced their numbering on the first day that the new moon appeared in the west. This course made it necessary to drop a day about once in two months, and thus reduce their year into twelve lunations instead of three hundred and sixty days. This being about eleven days less than the sidereal year, they discovered the discrepancy, and corrected their reckoning by the stars. In practice, therefore, the year varied, being sometimes twelve, sometimes thirteen lunar months. So also they sometimes numbered twenty-nine, and sometimes thirty days in a month." Fornander adds: "It thus appears that the Hawaiians employed two modes of reckoning—by lunar cycles, whereby the monthly feasts, or Kapu-days, were regulated, and the sidereal cycle, by which the close of the year, and the annual feast of Lono, was regulated."

It is frequently suggested by the evolutionists that the Polynesians acquired their remarkable astronomical knowledge as a result of the observations of the sun and constellations during their long-distance voyages in the East Pacific. However, if it should prove possible to reverse this sequence, and assume that the reason why the open Pacific was originally explored, and its respective islands thus detected, was because they were hit upon *not* by restless savages with a peculiar instinct, but by a culture people qualified for path-finding at sea through an ample understanding of astronomy, then the whole original discovery of all Polynesia would be much easier to conceive. And there is, in fact, reason to believe that the long period of astronomical observations and education that formed the necessary background for the Polynesian calendar system, had preceeded the Polynesian migrations into the open ocean. For all the principal groups of Polynesia happened to make use of the movements of the same constellation as their chosen sign for commencing the sidereal cycle on which they based their calendar year, namely the *Pleiades*, when these appear on the horizon in May or June according to the local latitude. (Ellis 1829, Vol. I, p. 87; Shortland 1856, p. 218; Fornander 1878, Vol. I, p. 118; etc.)

The astronomical foundation to the calendar year must have been laid, then, before the various Polynesian travelling parties dispersed all over the far-flung islands in the open sea. And if we turn our attention to Easter Island in the far east, where a corresponding time division was in use, we find another indication that the calendar system was known already in the country from which the island discoverers came. Thomson (1889, p. 533) recorded the local tradition that: "Hotu-Matua, driven from his kingdom to the eastward by the rebellion of his subjects, landed with a chosen band of followers on Easter Island, in the month of August (*Anekena*), ... The place where he made his landing, on the north-east coast, was named *Anekena* or 'August' by him in memory of that event." This indicates that a calendar system was known to him or his companions before he led his party on its 120-day expedition westwards to Easter Island.[1]

If Hotu Matua and the other earliest Polynesian pioneers came from the east, it is quite conceivable that they had their roots among culture peoples with a considerable knowledge of calendar systems and astronomy. Ruins of prehistoric astronomical observatories are found from Mexico and Central America (Morley 1946, p. 307) down to Peru (Valcarcel 1935, p. 115). In the former area especially we are able fully to appreciate the amazing knowledge of the ancient astronomers, as their early scientific measurements and calculations are preserved to us in their own contemporary inscriptions.

Linné (1939, p. 18) writes about the carved stone monuments of the ancient Mayas: "Of even greater importance than the datings are the astronomical results which are found incised, and through which the professional astronomers of our day have made almost sensational observations with regard to the exact knowledge of their Maya colleagues. Thus an inscription in the town of Palenque [Chiapas] states that 81 months are 2 392 days. This gives an average to the synodic month of 29.53086 days. A similar calculation made by the priest-astronomers in Copan [Guatemala] states that 149 months are 4 400 days, which gives a time of rotation of 29.53020 days. The difference between these values and those of our astronomers is respectively 24 and 33 seconds. But the Mayas had even discovered that after 235 moon-rotations, i. e. 6 940 days, the sun and moon were again in the same place in relation to each other. With the aid of the formulæ of the moon calculations, it was thus possible to determine the length of the solar year. This was fixed as 365.2420 days, which is only about 17 seconds shorter than its actual length. For comparison the Julian calendar may serve, which was satisfied with the less exact value of 365.25 days. Not even our present calendar, the Gregorian, which was introduced by Pope Gregory XIII in year 1582, is more exact than that of the Mayas."[2]

In his work on *The Maya Year* (1894), Thomas came to observe a number of analogies between the Maya and the Polynesian calendar systems, and he devotes several pages (pp. 57—64) to a review of these correspondences. His own conclusion is (*Ibid.*, p. 64): "Thus it will be seen that the Polynesian calendar, or at least that of Hawaii, possesses almost every essential feature of that in use among the Mexicans and Central Americans." Also: "Be the true explanation what it may, the evidence we have presented of its relation to the Polynesian calendar is too strong to be set aside as merely accidental."

Upon these conclusions, it might have seemed natural for Thomas to suggest that it was the small island tribes which had in some way benefited from observations and calculations that began in the old continental Maya observatories. But, in agreement with the usual way of reasoning, he says instead (*Ibid.*): "It may be observed merely that I expect to show in a paper relating to the origin and signification of the symbols and names of the Central American calendar that some of the names were probably derived from Polynesian sources." Also (p. 60): "...the points in which this Hawaiian calendar agrees with that of Mexico and Central America may be specially noted, since the former may have furnished the basis of some of the peculiarities of the latter."[1]

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[1] Métraux (1940, pp. 50—52) who recently gave the 30 names for the Easter Island days and the 12 names for their months, translates *Anakena* as 'July'.

[2] The Maya year was 1/10 000 of a day, or 8.64 seconds, more correct than our own modern calendar. The Maya year was 365.2420 days; the actual astronomical length of a year is 365.2422 days; our present Gregorian year is 365.2425 days; our former Julian year was 365.2500 days.

Since we have found reason to believe that Peru rather than Central America would be the likely starting point for a migration of American high-cultures into Polynesia, we must assume that any relationship between Maya and Polynesian calendar systems is due at most to a mutual relationship with some of the pre-Inca high-cultures in northwestern South America. We will therefore turn our attention to that area.

As Nordenskiöld (1925 b, p. 9) so emphatically points out, among the Incas, just as among the Central Americans, the more intimate details of the pre-Conquest calendar were only known among the ecclesiastical group of the local priesthood, who were those least accessible to the Christian chroniclers. Much of their wisdom, therefore, was never noted down by the Spaniards when describing the customs and conceptions of the aborigines. This is the more regrettable in the case of Peru than in those of Mexico and Central America where, as we have seen, the early priest-astronomers had incised much of their original calendar systems and astronomical knowledge on the surface of enduring stones. The three Maya codices that survived the destruction wrought by the Spaniards on their arrival have no representation of astronomers at work, but the Mexican codices of Nuttall, Selden, and the Bodleian all include ideograms of astronomical observatories with the eye of a priest-astronomer peering in the direction of a star through a sight formed of crossed sticks. (Morley 1946, p. 308.) In spite, however, of the scarcity of historical data concerning the knowledge of Inca astronomers, and the absence of preserved astronomical inscriptions or codices in Peru, we have sufficient evidence in the ruins of prehistoric observatories, as in Pisac or at Hatuncolla, to judge that the early Peruvian priest-astronomers were similarly engaged. (Valcarcel 1935 a, with ill.; etc.)

More interesting still are the vast astronomical markings in the desert areas of Peru which have been discovered in quite recent years, primarily through the development of aviation. Some fifty miles from the Pacific coast, near Nazca in the great desert of Pampa de Tanga, some pre-Inca astronomers removed the topmost layer of black stones in order to expose the almost white desert underneath. The cleared areas were in the pattern of enormous triangles, trapezoids, and narrow lines that run for many miles over the desert, all laid out with geometrical accuracy. The whole gigantic pattern has been recognized as representing astronomical marks, such as pointers in the direction where the sun, and the *Pleiades*, rise at the solstices. Although probably of Early Nazca and certainly of pre-Inca origin, these shallow depressions are still plainly visible because rain never falls to wash them away. (Kosok 1947, pp. 60, 92; Ross 1950, pp. 423, 448; etc.)

Even in later Inca time the Peruvian culture-bearers shared at least to some extent their early predecessors' interest in astronomy. In *The Incas of Peru,* Markham (1911, p. 115) writes: "The solstices and equinoxes were carefully observed. Stone pillars were erected, eight on the east and eight on the west side of Cuzco, to observe the solstices. Many were in double rows, four and four, two low between two high ones, twenty feet apart. At the heads of the pillars there were discs for the sun's rays to enter. Marks were made on the ground, which had been levelled and paved. Lines were drawn to mark the movements of the sun, as shown when its rays entered the holes in the pillars." And (*Ibid.*, p. 117):

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[1] In a later paper, "Maya and Malay" (1898, p. 89), Thomas merely states: "The strong resemblance in several respects between this Polynesian calendar system and the 'Native Calendar' of Central America is shown, in part, in my 'Maya Year'."

"The Peruvian year was divided into twelve *quilla*, or moons, of thirty days. Five days were added at the end, called Allcacanquis. The rule for adding a day every fourth year kept the calendar correct. The monthly moon revolutions were finished in 354 days, 8 hours, 48 minutes. This was made to correspond with the solar year by adding eleven days, which were divided among the months. They regulated the intercalation by marks placed on the horizon, to denote where the sun rose and set on the days of the solstices and equinoxes. Observations of the sun were taken each month."

In this Peruvian custom of adding five extra days at the end of the year, we recall the very calendar system recorded from ancient Hawaii, where Fornander stated that the natives "who counted twelve months of thirty days each, intercalated five days at the end of the month Welehu...", which in our own time reckoning would be about December 20.

As shown by Nordenskiöld, there is some contradiction between the statements of the early Spanish chroniclers as to when the Inca year actually began. First of all, both a solar and lunar calendar seem to have been observed, just as in Polynesia. (Velasco 1840, Vol. II, Pt. II.) But otherwise most early writers seem to agree with Garcilasso, who said that the Inca reckoned their New Year near the end of December, that is from the observation of the solstice. (Garcilasso 1609 a, Part I, Bk. II, Ch. 22.) This would make the five extra days at the end of the Peruvian calendar concur in *time* with the five extra Hawaiian days (i. e. at the end of December), in spite of the fact that the Hawaiians began their actual New Year at a later date, namely when the Pleiades rose, in our month of May. Now, the claim that the actual New Year of the Inca was *not* calculated from the December solstice came from Father Molina (1570—84, Vol. V, p. 131), who definitely states that the Inca year began in May. As we have seen, Molina was intimately acquainted with native chiefs and learned men who could remenber the Inca empire in the days of its prosperity, and whom he interrogated in their own language. His placing of the Inca New Year in our month of May is therefore the more remarkable.[1] Nor, as we shall presently see, is Molina's statement the only evidence we have to this effect in aboriginal Peru.

In his paper on the "Inca Culture at the time of the Spanish Conquest" Rowe (1946, p. 327) says, in mentioning the rich Inca star lore: "...the heavenly bodies were also observed in order to regulate the *Inca* calendar, an aspect of their study which is more properly classed as astronomical. The *Inca* took the movements of both the sun and the moon into account in making their calendar, but it is not entirely clear how the two were reconciled." Further (*Ibid.*, p. 328): "The calendar in use in the *Chimu* Kingdom seems to have been based on entirely different principles from that of the *Inca*, for Calancha says that the Chimu counted a year from the time the *Pleiades* appeared until they appeared again. The *Pleiades* were believed to be the patrons of agriculture." The same author says also of the Inca (*Ibid.*, p. 295): "A number of stars or constellations were believed to be the special patrons of certain human activities. The *Pleiades*... marked certain agricultural seasons."

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[1] The same old authority also tells us (*Ibid.*, p. 125) that the Incas kept an account of their calculations in years and months on their quipus. This has been verified in modern times by Nordenskiöld (1925 b) and others, who have analysed the calculations of numbers on some of the quipus, and found multiples like 12 (months) × 29.5 (days), 365 (days) × 10, etc.

Bennett (1949 a, p. 610), in his discussion of aboriginal Andean calendars, also writes: "Scattered references to the Chimu peoples mention an annual cycle based on the time of appearance of the Pleiades, which constellation was also the patron of agriculture." With reference to the contradictory opinions on the calendar arrangement of the Inca, he adds (*Ibid.*, p. 609): "The calendar was both agricultural and ceremonial. ... The ceremonial calendar began in December, ..."

We may now see the difference in Garcilasso's and Molina's information as to the commencement of the year in the Inca calendar. Garcilasso referred to the ceremonial calendar, which began with the December solstice and after the five extra days which, as in Hawaii, ended the ceremonial calendar at that time; whereas Molina very probably referred to an agricultural calendar, which began in May with the annual appearance of the Pleiades. This is the more probable since the Inca also regarded the Pleiades as the special patrons of agriculture and marked certain agricultural seasons by them, while at the same time the pre-Inca Chimu down on the Pacific coast simply considered the rising of the Pleiades as the beginning of their calendar year.

Garcilasso (1609, Bk. II, Ch. 21) also says about the Incas that, of the constellations, only the Pleiades were the object of worship. Some of the early Peruvians had a legend that the Pleiades represented the eyes of some departed hero. (Means 1931, p. 402.) In *Maori Tales and Legends* McCosh Clark (1896) says with Tregear: "The Maoris believe the seven stars of the Pleiades to be the left eyes of great chiefs, who after death were translated to the heavens."

The attention paid by the Inca, by the pre-Inca Chimu, and by all the Maori-Polynesian tribes, to the specific constellation of the Pleiades is remarkable in view of the myriads of other and equally impressive stars and constellations that cross the tropical sky, and yet it is by no means unique. Lewis (1947, p. 14) writes: "Mrs. M. W. Makemson tells us that several tribes of American Indians had adopted a stellar constellation as one of their ancestors, namely, the Pleiades; also that in Oceania a constellation was frequently worshipped as an ancestor, and always the same constellation, the Pleiades. A fact such as this leads us to suspect that there may have been actual movement of a people across the South Pacific."

In his study of *Primitive Time Reckoning*, Nilsson (1920, pp. 274—276) writes of the calendar year based on the movements of the Pleiades: "This Pleiad year is especially common in South America, where there are no series of months, and in Oceania." Also: "The Lengua Indians of Paraguay connect the rising of the Pleiades with the beginning of spring, and hold feasts during this time. The Guarani of the same country determine the time of sowing by the observation of the Pleiades; it is said that they used to worship this constellation, and they begin their new year at its appearance in May. In the Amazon valley the rising of the Pleiades coincides with the revival of Nature, and hence the people say that everything is renewed by these stars. The Indians of the Orinoco determined the new year by the evening rising of the Pleiades. But still further, the year is called by the name of the Pleiades. Certain tribes of Venezuela reckoned the year by stars, and in fact by the Pleiades. 'Year' is *tshirke*, 'star'; a year = a star. The word occurs in various forms among most of the Carib tribes; among the neighbouring Caribs *tshirika* is found many times as a translation of 'the Pleiades'. The connection becomes clear in the wide-spread Carib idiom of the Guaianas: in a Galibi dictionary 'star' and 'year' are given as *serica*, *siricco*, the Pleiades as *sherick*, and we read in brackets: 'The return of the Pleiades above the horizon together with the sun forms the solar year of the natives.' Among the island Caribs the Pleiades are called *chiric;* these people reckon the years in 'Pleiades'. Among the Arawak *wijua* means 'Pleiades', 'star' in general, and 'year', since they reckon the year from the point at which they see the Pleiades rise after cock-crow." Further: "Among the Polynesians the Pleiades year was extremely widespread." As we have seen, in Polynesia the Pleiad year seems to have been quite universal, and although commonly known as *Mata-riki* or *Maka-lii*, the Pleiades were also referred to as *Whetu-o-te-tau* or 'Star of the Year'. (Smith 1910 a, p. 90.)

However, in Andree's paper (1893) on the Pleiades in mythology and their connection with the New Year and agriculture, we find that, east of the Americas also, certain leading Old World civilizations, for instance the ancient Hellenes, arranged their agriculture according to the position of the Pleiades. Westwards of Polynesia, too, the same custom was sporadically observed, as in the Solomons, in Bali, and in Borneo. The Dajaks of Borneo considered the Pleiades to be the home of their patron of agriculture, *Si Kira*, who first taught them to cultivate their rice, and the old men watched the movements of this constellation at night to adjust their planting accordingly. (*Ibid.*, p. 366.)

When we analyse this distribution of the Pleiad year in its more or less developed form, the centre of gravity of which seems to be historic South America and Polynesia, one is led to suspect that this constellation happens to stand on the horizon just at the favourable time for planting, and thus was naturally selected as time marker for all these agriculturists. This explanation is not satisfactory. The custom of the Chimu in Peru, and all the islanders in Polynesia, of reckoning the New Year from the first yearly appearance of the Pleiades on the horizon, was not shared by the Mediterranean civilizations or the Dajaks. Fornander (1878, Vol. I, p. 116) says of the Pleiad year in the former area that "it began on the 19th day of *Athyr*, or November, when the Pleiades, or their containing constellation, the Bull... was on the meridian at midnight." The Dajaks on the other hand employ the Pleiades in a third and quite different manner; they begin their planting and their New Year celebration when the Pleiades stand at about three or four o'clock in the morning in the position which the sun assumes at about eight o'clock, and they have apparently some trouble in judging the exact spot. (Andree 1893, p. 366.) The fact that the Polynesians follow the Chimu custom on all their islands, irrespective of latitude (which ranges from 20° N to 40° S), gives them different times for the first raising of the Pleiades, and thus a *different commencement of the calendar year* in the different islands. The consistency in the observance of the Pleiad year throughout Polynesia thus proves that we are here dealing with an old traditional calendar arrangement imported into the islands from one common source. As there is no other indication that Balinese or Dajaks voyaged east to Polynesia, we have every reason to suspect that it was the Pleiad year on the Chimu coast and in widespread areas of aboriginal South America that found its way down wind to Polynesia.

Heine-Geldern, searching for casual and sporadic analogies to Polynesian culture anywhere from Pakistan to East Asia, claims (1950 b, p. 189), with regard to the calendar conceptions, that "some traits of Polynesian time reckoning systems (ten day weeks on Niue and Hawaii, ten year cycles on Easter Island) have their closest parallels in China." This is correct only if Peru and South America are excluded from consideration in Polynesian affairs. The Easter Island custom of reckoning with ten-year cycles has long since been recorded from Pacific South America. Montesinos (1642, p. 34) thus writes of the early Peruvian time reckoning system: "...ordinary years were counted as having three hundred and sixty-five days and hours, and then there were decades, giving each decade ten years, ..." Neither need we resort to China for the ten-day weeks recorded from parts of Polynesia. Montesinos says of a meeting of amautas in the life of Ayay Manco, the thirty-fifth of the pre-Inca kings in his list (*Ibid.*, p. 51): "After the meeting had lasted many days, it was decided that they would not count the year by moons, as up to that time, but that each month should have thirty fixed days, and that the weeks should have ten days, ...And he ordained likewise that there should be weeks of ten days, so there should be groups of ten common years, ..."[1]

We may add that there is some evidence that even so unnatural a period as a ten-month year was attempted in parts of ancient Peru. As Bennett (1949 a, p. 610) writes: "Cieza de León (1553) states that the *Aymara* had a year of ten months, but this is not confirmed by any other writer." Again, Fornander (1878, Vol. I, p. 120) writes: "There is evidence that the Marquesans at one time counted the year by ten lunar months, and called it a *Puni*— a circle, a round, a revolution—but how they managed either this or the year of thirteen months to correspond with the sidereal year, I am not informed."

Apart from the scarce references to Inca calendar systems, we do not know much about their conceptions of the universe. But we know that, like their predecessors on the Tanga desert plains of the coast, they followed the movements of the major stars. Markham (1911, p. 117) states: "The stars were observed and many were named. Valera gives the names of five planets; ..."

The location of the equator—known to the Polynesians as "The Road to the Navel (*Piko*) of Light (*Wakea*)"—was also known to the Peruvians, about whom Montesinos (1642, p. 35) wrote: "Also they had some knowledge of leap-year on account of the fact that their astrologers had observed the time at which the sun crossed the Line, which they marked out near Quito, where we ourselves say it goes, by means of some large walls that are to be seen to-day."[2]

Peruvian astronomers and seafarers who gazed with profound curiosity upon the myriads of stars and constellations that passed from east to west over their open desert and ocean sky night after night without cessation, saw also their venerated sun setting out in the same westward direction every day, while out at sea the trade-wind clouds and chasing seas joined the company of all these westward travelling heavenly bodies. A nature people who worships the sun as a guide and ancestor must be gradually beset with a desire to follow in the path of such an uninterrupted mass migration, to discover whatever be the attraction at sea beyond the western horizon. No people could be better fitted for purposeful explorations in the trail of their father the sun than those who dwelt for untold generations in Peru, equipped with a safe and seaworthy craft and a full ability of astronomical path-finding, and located just where currents and wind set out with the desired westward course. The Gilbert Island navigators call the night-sky *uma ni borau*, "roof of voyaging". (Grimble 1931, p. 197.) But we should bear in mind that the heavenly bodies might have been more than a perfectly dependable map for the early island discoverers—they might possibly even have served as a religious guide tempting aboriginal man into the vast empty spaces that concealed the oceanic islands from any other foothold of humanity. An early Maori poet, whose tradition is quoted by Buck (1938 a, p. 19), alludes thus to the earliest deified migrants from the primordial Fatherland into the Pacific: "They have passed along the path that beckons the thousands, the path that calls the myriads, the path that sends no messenger to the rear." There is no such path but the westbound path of the stellar heavens.

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[1] Poma, too, speaks of a week of 10 days used in aboriginal Peru. (Rowe 1946, p. 328.)

[2] In Polynesian mythology Wakea means not only "Light", but, as we have seen, it is also another of the symbolic titles or sacred allusions to the mythical divine progenitor who occasionally begins the earliest royal lines. From Polynesia the road to "Wakea's Navel" and the source of Light takes us directly to Quito, or rather to the Ecuadorian coast near Puerto Viejo, where the legendary Peruvian sun-king Tici from Tiahuanaco selected his point of departure from which he migrated with his Viracochas into the Pacific. The name of the Peruvian capital, *Cuzco*, means "Navel" according to Garcilasso, and it is not improbable that the very ancient Ecuadorian capital *Quito*, like the Polynesian term *Piko*, also originally meant "Navel".

Kawa, the ceremonial drinking of a salivary ferment

One of the most remarkable Polynesian culture elements still to be considered is the almost pan-Polynesian *kawa*-drinking ceremony. With very few sporadic exceptions, like New Zealand, Niue and Easter Island, *kawa* or *awa* has been made and used in all the principal parts of Polynesia right into modern times. The *kawa*-making is thus most certainly some old traditional custom brought along by one of the component parental stocks that went to the forming of the composite Polynesian tribes. What is more, it is another of the culture elements that rather conspicuously mark off Polynesia from Indonesia and the Asiatic mainland behind.

For more than a century, however, writers have occasionally commented that, if we look at the aborigines on the *east* side of the Pacific, the *kawa*-drinking custom may not appear unique. Moerenhout (1837, Vol. II, p. 244) was perhaps the first to point out that: "The American Indians make exactly the same thing, but with other plants." In modern studies of South American narcotics (e.g. Taylor 1950, p. 91), we find direct comparisons between the *chicha* of the Andean tribes and *kawa* of Polynesia. Rowe (1946, p. 292) writes from Peru: "The Inca made a number of fermented drinks or chicha (AQHA) from different cultivated plants—maize, quinoa, ocas, and molle berries—but had no distilled liquor. Chicha was made by women, who chewed the pulp of the fruit used, and spat the mash out into jars of warm water. The liquid was then allowed to ferment to the desired strength. The strongest chicha was made from the molle berries. Chicha was the everyday Indian beverage, and was also an important element in all ceremonies, being served in enormous quantities during ritual dances, when all the participants were supposed to drink until they dropped. To the Inca, intoxication was a religious act, not an individual vice. Indians did not drink to excess except at the prescribed point in their regular ceremonies."

The ceremonial drinking of this salivary ferment has a great antiquity and wide distribution on the American side of the ocean. Although best known as *chicha* in the modern Andes, the old native name in Peru was *aqha* or *acca* (Markham 1911, p. 127), and its name among the natives of Chile was recorded by Brouwer more than three hundred years ago as *cawau.* (Brown 1924, p. 263; Friederici 1929, p. 461.) Both *acca* and *cawau* are remarkably like the Polynesian terms for their corresponding drink, *awa* or *kawa*, and so is the native term for the same traditional beverage in Brazil, *kasava* or *cassava* (Garnier 1870, p. 27), and in Colombia, *aba* (Bollaert 1860, p. 61).

Friederici (1929, p. 461) shows that attempts have been made linguistically and ethnologically to associate the Tupi-Indian word *cauin*—denoting a similarly chewed intoxicating beverage—with the word and the custom of the Polynesian *kawa.* But doubting whether there is any actual linguistic connection, he is more inclined to compare the Polynesian *kawa* with the term *copah*, from the equivalent drink *chichah co-pah* in southern Panama, since aspects to the traditional drinking rites were also common to these two areas. But while he admits that these are analogies of doubtful value, he finds that the peculiar manufacturing principles and the associated ceremonial rites in the Andean area and Polynesia are so very similar that it "makes a connection between the two highly probable."

In fact, as in Peru, so also in Polynesia: the traditional *awa* or *kawa* was always made by women, who chewed the pulp of a certain native root, generally *Piper methysticum*, and spat the vegetable mash into wooden bowls, where it was mixed with warm water and then set aside to ferment. The solid material of the chewed roots was removed and the water strained out of the particles by passing through a sieve made of the shredded fibrous tissues of certain plants.[1]

As in Peru, so also in Polynesia: the peculiar salivary ferment thus prepared was an everyday beverage, but at the same time it played a major part in the rituals and ceremonies of both areas. On the islands too we find that the intoxication resulting from the consumption of this fermented beverage was not an individual vice, but was attained in the course of a solemn and religious act. (F. B. H. Brown 1935, p. 19.) The ferment was consumed in a calm and serious manner, without the joyful or boastful demeanor caused by distilled liquor, although the natives occasionally drank till they rolled over asleep. As Turner (1861, p. 394) wrote from one of the many islands: "The people worship the spirits of their ancestors. They pray to them, over the kava-bowl, for health and prosperity; . . ."

As we have seen, the almost universal spread of the *kawa*-drinking ceremonies on the far-flung islands of Polynesia proves that the custom is ancient and imported. It had spread with the early Polynesian colonists who ended up in Fiji and other Papua-Melanesian islands exposed to influences from the east, but disappeares completely further west. In Micronesia the custom seems to have been limited to Ponape and Kusaie in the eastern Carolines. (Linton 1926, p. 48.) From these two East Micronesian islands—the very two

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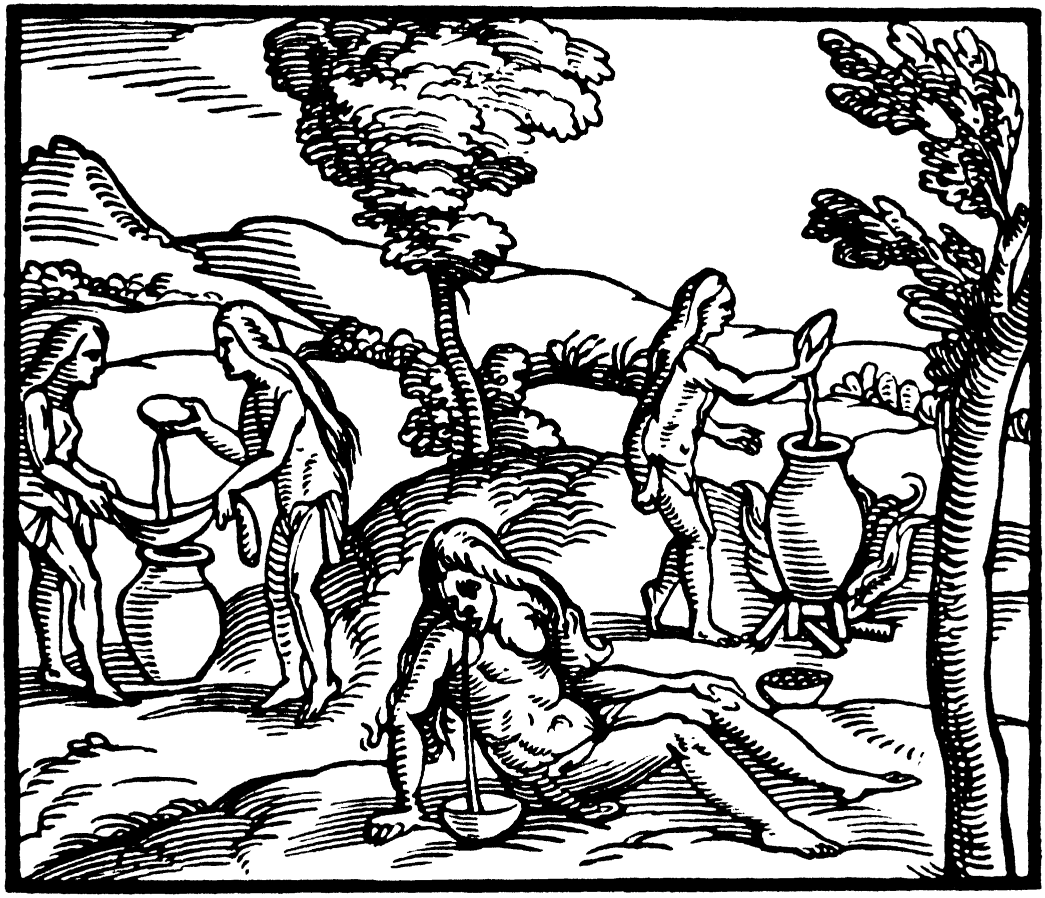
[1] *Kawa* is still today occasionally made in some parts of Polynesia, for instance in the Marquesas group.



Natives of Peru making *aqha*. (From an old drawing by Benzoni 1565.) The woman in front is chewing and expectorating the mash, the two at the left are straining the liquid out of the mash by sifting it through a cloth, and the one at right is warming it up before it is set aside to ferment.

that contained the megalithic ruins facing eastward—and right back across Polynesia to Peru, Chile, Bolivia, Brazil, Ecuador, Colombia, Central America and Mexico, we find the distribution area of the *awa*, *kawa*, *aba*, *acca*, *aqha*, *cawau*, *cassava* series, all being ceremonial beverages of a salivary ferment that vary only with the local access to plant species from which to chew the required mash.

We have seen earlier that there are Polynesian memories to the effect that their forefathers chewed certain leaves to reduce their need for fresh water on early ocean voyages, and that this custom corresponded in manner and purpose to the coca-chewing habit in Peru. With the drinking of the salivary ferment pointing in the same direction, we have found in Polynesia traditional and historic analogies to the two specific narcotics which were almost universal among the natives of Peru. Although the tobacco-plant grew in the aboriginal Andean area (and perhaps also in Oceania)[1] there is neither historic nor archæological evidence of the smoking of tobacco among the aboriginal population in either of these two areas. (Sauer 1950, p. 523.) The absence of alcoholic beverages in ancient Peru was equally conspicuous in Polynesia, as we have seen, and Brown (1927, Vol. II, p. 146), like others before him, points to the singularity of this fact in view of the importance of palm-toddy in the Malay Archipelago and the east coast of India. He says of hypothetical Old World migrants into the East Pacific (*Ibid.*): "It is another mystery that the coco-nut should have been taken with them by the emigrants and its chief use abandoned for the far less intoxicating and seductive kava of the central Pacific, which has to go through the process of mastication and expectoration before it is ready to drink. ... This latter rather affiliates with chicha of the Pacific coast of South America, and goes no further west than to the southeast of New Guinea, where it meets the betel-chewing habit coming eastwards."

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[1] For literature on the tobacco-plant (*Nicotiana*) in the Pacific see: Hooker (1855); Lemaire (1855); Preissecker (1910, pp. 350—355); Wheeler (1935, pp. 45—68); and not least a forthcoming publication by T. H. Goodspeed (Chronica Botanica).

To summarize: we find in the kawa-drinking custom a peculiar traditional culture element so ancient and widespread in Polynesia that we may deduce an origin outside the islands—and we find actually an equivalent in production, usage, effect, and name on the nearest mainland coast on the windward side. But if we turn instead to Indonesia, not only do we fail to find anything which explains the origin of this pan-Polynesian element, but we meet on the contrary first the use of alcohol, and secondly the old Asiatic betel-chewing habit, both of which merely form new obstacles to any attempt to bring either savages or culture peoples from that area out across the Pacific.

The absence of betel-chewing in Polynesia

Taylor (1950, p. 91) writes: "Over two hundred million people scattered all around the shores of the Indian Ocean, on all the islands of it, and stretching far to the eastward through the Dutch East Indies, chew the betel nut... Its source is cultivated in every garden, and in some places there are extensive plantations of the palm that yields the nut. ... In Ceylon seventy-five thousand acres are devoted to the growing of over one hundred million trees, so great is the demand for the betel nut; ..."

As Friederici (1929, p. 462) points out, the custom of chewing betel with burnt lime was of hoary age in the West Pacific, extending right eastwards from India through the islands of Malaysia and Melanesia. In other words, this specific Asiatic culture element was carried out of Indonesia with the early Melanesian migrants and went with these primitive peoples as far as they were able to go across island-bridges and channels eastward of Papuasia. The limit of Indonesian influence in Micronesia is again shown by the fact that the chewing of betel occurred only in the Palaus and at Yap in the Carolines (Linton 1926, p. 48)—that is, in the same south-western corner of Micronesia that marks the border-territory between the Old World and true Oceania. The Polynesians, however, brought the *kawa*-drinking habit with them instead of betel-chewing; none of them carried the betel-nut of the areca-palm on their migrations, and they were unfamiliar with the burning of lime.

The division between kawa-drinking and betel-chewing is perhaps one of the clearest ethnological markers left by the two opposed migration streams into the Pacific: betel-chewing coming from Asia and extending as far as the Old World migrants were able to proceed by land through Malaysia and Papua-Melanesia; while kawa-drinking came by sea down-wind across the oceanic island area from the open coast of tropic America. The demarcation line is clearly marked, and only in the extreme southwest corner of Micronesia have the *Indonesians* succeeded in introducing their own traditional habit, whereas the *Polynesians* have been entirely free of it, bringing their favourite beverage instead to those specific parts of Melanesia which they penetrated from the east.[1]

Trepanning

A custom which seems to have been in vogue among some of the early Polynesians, but which was so little practised among the historic tribes that the possibility of a wider local use in former times might have been overlooked unless it had survived so fully in adjoining Melanesia, is the art of trepanning. The surgical operation known as trepanning, that is the perforation or removal of part of the cranial roof on a living person, was regarded by modern surgeons as extremely dangerous and difficult right up to the second half of last century. Its practice among an isolated island people should, therefore, be given serious attention, even though its local occurrence is of a sporadic and rudimentary nature.

In his review of "Primitive Surgery", Ackerknecht (1947) shows that the art of treating injuries or diseases by manual operations has a rather limited world distribution among primitive peoples. With the specific exception of prehistoric Peru, where surgical knowledge was highly developed (*Ibid.*, pp. 29—37), he says of primitive tribes that "only in the more southern parts of East Africa and in certain Polynesian localities do we encounter a relatively well-developed surgery." In fact, we find in the early literature of Polynesia frequent references to the native skill and readiness in treating wounds, fractures and serious dislocations, from which we have ample evidence that they must of old have been physiologists as well as astronomers and seafarers.

Ellis (1829, Vol. III, p. 42) wrote from the early Society Islands: "A fractured limb they set without much trouble; applying splinters of bamboo-cane to the sides, and keeping it bound up till healed." Also (*Ibid.*, p. 43): "The operation of trepanning they sometimes attempted, and say they have practised it with success. It is reported that there are persons living in the island of Borabora on whom it has been performed, or at least an operation very much resembling it: the bones of the skull having been fractured in battle, they have cleared away the skin and coverings, and, having removed the fractured piece of bone, have carefully fitted in a piece of cocoa-nut shell, and replaced the covering and skin; on the healing of which, the man has recovered. I never saw any individual who had undergone this operation, but, from the concurrent testimony of the people, I have no doubt they have performed it."

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[1] Several writers (e. g. Nordenskiöld 1931, p. 31) have compared the Asiatic custom of chewing betel and lime with the North and South American custom of chewing local narcotic leaves and lime, such as tobacco, coca, etc. The antiquity of the custom and its wide spread among both Asiatic and New World tribes indicate either independent invention on both sides of the Pacific, or a common primeval source antedating the period when the Americans crossed the Bering Strait. The only possibility of recent inspiration across the sea may perhaps be seen in the calabash containers for lime found among certain Melanesian betel-chewers, where the lime is extracted from the calabash bottle by means of a rod or spoon which often serves as a stopper also. This seems rather like a fairly recent (and yet prehistoric) imitation of the correspondingly fitted calabash receptacles for lime formerly used among coca leaf chewers on the Pacific coast of Peru, and still used in Colombia and eastern Peru. (*Ibid.*, p. 29; etc.) It is not impossible that this type of lime-containers spread with the calabash itself, from the Pacific coast of Peru and westward across the ocean, in the first island period prior to the Maori-Polynesian conquest of the East Pacific.

In a monograph on *Ancient Tahiti*, Henry (1928, p. 145) states: "It is well authenticated that the natives mended broken skulls with the shell of a half-mature coconut; ... and that they mended broken shinbones by taking out the splinters and replacing them with nicely fitted pieces of the sacred ti. In confirmation of this statement there are found in caves skulls and shinbones that have been thus mended, some with a ridge to the bone that has grown around the patch, holding it firm. Until 1904, there lived at Fautaua an old chieftain named Peue, who was one of a few surviving doctors of this class, and who testified to the fact that he and his father, also named Peue, performed such cures among their people during the French-Tahitian war."

Trepanned skulls have also been found in ancient burial caves on the islands of Hivaoa and Nukuhiva in the Marquesas Group. A specimen from Nukuhiva, collected by Dumoutier, is on exhibit in the trepanation case of Musée de l'Homme in Paris, and the rebuilding of osseous substance around the edges of the trepanation opening shows the patient to have survived the operation. The post mortem embellishment of the lower part of the skull with boar tusks attached by means of ropes plaited from coconut fibres, goes to show that the cranium has derived from an aboriginal Marquesan burial. This trepanned Polynesian skull is placed next to one from Peru, under the caption: "Trepanation is practised in the Mediterranean area (Berbers of the Atlas), in Polynesia and in the Andean region, where it existed already in pre-Columbian times."

Stewart (1832), one of the early travellers to visit the lonely Marquesas group when the local inhabitants were still "in every respect unchanged" (*Ibid.*, p. 128), wrote concerning the duties of the *tahunas*, or priests (*Ibid.*, p. 175): "These are various, and consist principally in offering sacrifices, and in performing the ceremonies of their idolatry; ... and performing surgical operations; such as the dressing of wounds received in battle, the extraction of fractured bones and, it is said, even that of trepanning with a shark's tooth, in case of injury of the skull."

In the Marquesas group memories of trepanation still survive among the inhabitants both of Hivaoa and Fatuhiva, and possibly even on some of the other islands in the same group. Tei Tetua, an old chief in Ouia on the east coast of Fatuhiva, gave me of his own accord an eyewitness account of a trepanation which was performed during his own youth. (Heyerdahl 1941 a, p. 136.) A native of Ouia had fallen down from a palm and had fractured his skull, whereupon he was immediately taken to a noted *taua* or medicine-man by the name of *taua* Teke. (A small stone statuette named after *taua* Teke was still standing near the beach at the mouth of the Hanahepu valley.) After appropriate dancing and incantations, in which a coconut bowl of steaming water seemed to play a principal part, Teke washed the wound and cut a deep cross-shaped incision in the skin over the fractured part of the skull, whereupon he exposed the osseous parts. Splinters of bone were carefully removed, and the broken edges were cut and polished evenly all round, whereupon a thin and finely polished piece of coconut-shell made to fit was used to cover the opening, and the withdrawn scraps of skin finally brought back into their original place. All hair on the injured part of the head was removed. According to Tei's information, the trepanning was visible in after years only as a very distinct scar in the shape of a cross. The person on which this operation was performed became slightly defective mentally, but he survived the operation several years. According to Tei, such operations were not so unusual in former times, but no further attempts were made by the *taua* if, upon the removal of skin and splinters, the brain itself proved to be injured. In my attempts to obtain further information on the same subject on Hivaoa Island, I was told that two skulls repaired by a small circular piece of coconut-shell had been found among a great number of crania in a burial cave, but were taken away with other ancient relics by the crew of a cruising yacht. A broken section of an artificial opening which appeared to be a partly healed trepanation was also found by the author on a skull-fragment in a local burial cave, but a row of small perforations along the edge had possibly been made post mortem.

The exceedingly sparse ethnological literature on the Marquesas Islands furnish no important data on the former practice of trepanation, but F. B. H. Brown (1931, p. 125), who during his local botanical research became intimately acquainted with the natives, also says, in describing their various uses of the coconut palm in former times: "According to native informants, the coconut shell was used in repairing the fractured skull."

In *The Native Culture in the Marquesas*, the only monograph on the local ethnology, Handy (1923, p. 269) enters a brief reference to trepanation under the caption "Surgery". He writes: "Surgeons (*tuhuna tatihi*) were professionals who devoted themselves to setting fractured limbs, replacing dislocated joints, trepanning, and so on. The profession of surgery seems to have been combined with that of healing by means of medicines (*tatihi* or *fainu*). At Atu Ona, the grandson of a famous surgeon told me that his grandfather used to repair injured skulls by inserting (whether in the scalp or in the skull itself was not definitely understood) a piece of coconut shell, the edges of which were perforated."

Handy says he was unable to verify the detail pertaining to the inserting of the coconut shell, but adds (*Ibid.*): "Mr. Linton saw and photographed a trepanned skull at Hana Pa'aoa."

Due south of the Marquesas and east of Tahiti, at Fangatau in the Tuamotus, Emory (1942 b, p. 132) records the finding of a skull which "may have been trepanned." Since the trepanation openings are quite extensive, and there is no definite sign of healing on the osseous edges, we are not able to judge definitely whether this operation was unsuccessful, or made post mortem. It is, however, difficult to see any reason why the natives should have opened the skull post mortem.

Wölfel (1925, p. 13), in his thorough study of trepanation, states that there are a number of casual references to the former practice of trepanation in the Fiji islands and Tahiti, and he adds that: "Another quite unconfirmed report has unexpectedly been verified, namely the occurrence of trepanation in New Zealand. In the cranial collection of the Natural History Museum in Vienna, I discovered a distinct trepanation on the skull of a Maori from Waipu (Reischek collection, No. 3097)." An analysis of this trepanation opening proved that the native had survived the operation several years, since a considerable healing process had taken place around the osseous edges. (*Ibid.*)

The best accounts on the practice of trepanation in Oceania are preserved from Melanesia. This may be due to the fact that, in Polynesia trepanning was resorted to only in the rare event of necessity, and in many parts gradually fell out of use during the recent island era; whereas in Melanesia trepanning assumed more of a magical importance and thus established itself through practice on individuals who in no way needed to undergo that operation. Thus Ackerknecht (1947, p. 34) gives the following examples respectively from Polynesia and Melanesia: "In Tahiti the indication seems purely surgical; in Uvea, purely magico-medical ('headache'). Almost all men are trephined there."

Wölfel (1925, p. 2) writes: "We find a wide distribution of trepanning in the extensive areas of Melanesia and New Guinea inclusive of those marginal territories where the Melanesians mix with the Polynesians in the east." Further west, as we shall later see, the operation of trepanning was unknown. Wölfel (*Ibid.*, p. 3) quotes Parkinson on the practice of surgical trepannation in the Bismarck Islands. We read of the medicine-man who performs the operation: "His instruments are the simplest one can imagine, a chip of obsidian, a sharp shark's tooth, or a sharpened shell. Before the operation, he washed his never very clean hands with the water of a *Kubika* [an immature coconut full of juice but without kernel], and with the same water the wound is also carefully cleaned. ... With one of the aforesaid cutting instruments the surgeon now makes a long incision right across the bruise into the skull-bone. By means of a thin rattan thread fastened to a lock of hair, two assistants slowly and carefully pull back the piece of scalp that is detached from the skull-bone, until the surgeon has the entire injured part of the cranium laid open. The next task is to remove the bone splinters. The single splinters are carefully lifted away by means of a sharpened piece of a coconut shell, until the brain becomes visible. This is now carefully examined by the surgeon. If he finds that the brain shows a gentle pulsating movement, then he is very relieved and promises a rapid recovery, but if he observes no motion, then this is an indication that the bone splinters have penetrated into the brain, and he assumes a serious air, but he does not give everything up, as he begins to search for the lost bone splinters. For that purpose he lifts the brain-folds carefully apart, until he finds between them the hidden splinters which he removes, the instrument employed being the earlier used pieces of coconut shell.

"If everything so far has been crowned with success, then the next stage of the operation commences. This consists in the surgeon scraping off the edges of the opening in the cranial roof, which is done by means of a sharp object, an obsidian chip or a sharpened shell, so that all sharp corners are removed and the hole becomes round or elliptic. Great care is taken that the parts scraped off do not fall into the cranium. When this task also is ended the actual operation is finished, and the surgeon takes the necessary steps to further the healing of the wound. He covers the hole in the skull with a piece of *mal* [bark-cloth from a certain tree] or with a little piece of the central leaf of a certain banana, which has first been held a few moments over the charcoal of a fire. Then the pieces of the scalp are slowly and carefully pulled over the skull and back into their original position. The hair around the wound is now cut off, and finally everything is carefully washed with the water of a *Kubika*. A narrow-fitting and widely masked net plaited from strips of rattan, known under the name *Kalil*, is pulled over the upper head to hold the pieces of the scalp in position, and thereby to further the healing." After the surgical work follows the magical performance and incantations which most impress the natives, and the author continues: "Whether it be the result of the surgical skill of the operator or of his magic, so much is certain, that in most cases the operation succeeds. Not only do I know a great number of induviduals thus operated on, who are still alive today, years after the operation, but my collection contains many skulls of natives who lived long after the operation and of whom many were personally known to me. ... An old native ennumerated for me 31 cases in which he had performed the operation; of these 23 survived, and many of them were introduced to me. One of them has been twice operated on, each time successfully, and he is now an old man about 60 years of age, having received the first wound as a youth and the second about 25 years ago. It sometimes happens that a mental disturbance occurs after the operation, which is either permanent or periodic, but I know of no case from my own experience..."

Wölfel (*Ibid.*, p. 5) also quotes Crump from Melanesia: "I have recently discovered that on New Ireland the operation is performed not only in the case of fracture but where there are epilepsy and certain forms of insanity as the result of pressure on the brain. I have in my possession a skull which has been successfully trephined in no less than five places, the man meeting his death some years after the last operation by a blow from an axe. This man suffered from severe headache with local throbbing. The operation was performed each time in the region of the pain, and though no cure seem to have been effected, the operation was at any rate perfectly successful. ... After trephining has been performed there is frequent partial temporary paralysis which almost invariably passes away, though in a few cases it is permanent. Idiocy is an occasional result also. But the natives affirm that while the cures of insanity and epilepsy are many, the instances where either malady supervenes after the operation are exceedingly few."

Also (*Ibid.*, p. 7): "The man who performs the operation is the wizard, '*tena papait*' of the tribe or district, using a piece of shell or a flake of obsidian for a trephine. An incision is made over the seat of the fracture generally in the shape of a Y or V and then perhaps some loose fragment is picked out with the finger nail, and while assistants hold back the scalp, the fractured bone is scraped, cut and picked away, leaving the brain exposed to the size of half-a-crown. Then, all loose pieces having been removed, the scalp is carefully laid down and the wound bandaged with strips of the banana stalk about four inches wide. These strips are when dry of a spongy nature, the water which formerly filled the cells being replaced by air. Moreover the inner surface is silky to the touch and forms an admirable dressing for tender surfaces. It is astringent in its action and non-absorbent, all discharge escaping below the bandage. Sometimes a few bruised leaves are applied before bandaging... In five or six days the bandages are renewed and in two or three weeks a complete recovery is the result. The number of deaths is about 20 per-cent, most of them resulting from the first injury and not from any complication after the operation. ... It has become fashionable, and a handsome boy or girl is generally persuaded to submit to the operation as an aid to longevity, there being no absolute need for its performance."

Wölfel (*Ibid.*, p. 11) also quotes the Rev. Ella from one of the islands next to Samoa: "A very surprising operation is performed on the island of Uvea in the Loyalty Group. A notion prevails that headache, neuralgia, vertigo, and other cerebral affections proceed from a crack in the head or pressure of the skull on the brain. The remedy is to lay open the scalp with a + or T incision, then scrape the cranium carefully and gently with a piece of glass until a hole is made in the skull, down to the dura mater, about the size of a crown piece. ... In the best of hands about half of those who undergo the operation die from it. Yet this barbarous custom, from superstition and fashion, has been so prevalent that very few of the male adults are without this hole in the cranium. I am informed that sometimes an attempt is made to cover the membranes of the cranium so exposed by placing a piece of cocoa-nut shell under the scalp. They select a very hard and durable piece of shell from which they scrape the softer parts and grind smooth. Formerly the trephine was a shark's tooth." To this Wölfel adds: "The information from Uvea is verified by Turner and F. Sarasin. Ray writes from Lifu island in the same group: 'The natives of Lifu had considerable skill in surgical operations. They have trepanned wonderfully, removing a portion of the skull and replacing it with a piece of coconut shell.' "

About a dozen different sources are quoted by Wölfel for eyewitness reports on the performance of trepanation in Melanesia in historic time. The wide range of this peculiar and very difficult practice among the mutually separated island tribes, from the aborigines of the Bismarck archipelago and eastern New Guinea and eastwards at least to Tahiti, Borabora and the Marquesas group, is another sign of an inspiration or influence from a common source. The Melanesian trepanation area is separated from Indonesia in the west by more than a thousand miles of hostile and occupied New Guinea coastline, and from Polynesia and South America in the east by nothing but perpetually approaching water. In addition, we have the decisive point that in Indonesia and the whole continent of Asia trepanning was formerly an unknown art, whereas in South America—and especially in Peru—trepanning had been one of the most characteristic local culture elements for more than a thousand years prior to the Inca era. Wölfel (1925, p. 1) shows that trepanation was known in prehistoric Europe, especially in the Mediterranean area, in North Africa, where it survived among the Berbers of the Atlas countries, and even among the aborigines out on the lonely Canary Islands. It appeared sporadically in the Americas, from British Columbia in the north to Chile in the south. But from the Mediterranean basin the distribution shows, as Wölfel points out, a "yawning gap" throughout all of Asia, until trepanation recurs in Melanesia and eastern New Guinea, on the opposite side of the Old World.

The bulk of evidence of New World trepanation comes from Peru, where the custom was early pre-Incaic but survived two millennia and was observed by Europeans in historic times. (Freeman 1924; Ackerknecht 1947.) Posnansky (1914, p. 76) has several times excavated trepanned skulls from Tiahuanaco, while Tello (1929, p. 144) states that no less than 40% of the ancient mummies from the Paracas peninsula on the coast had trepanned skulls. (We have earlier described the peculiarities of their hair.) North of Panama trepanation was also practised, but evidence is nowhere rich. The northernmost find was made in an ancient shell midden on the southern coast of British Columbia (Hill-Tout s. a.; Kidd 1948) associated with a stone statuette and other artifacts suggested by certain writers to be reminiscent of Central American culture. This trephine opening, like those on a few sporadic archæological skulls from the source of Mississippi to Tarahumara and a few other casual sites in Mexico, was of the circular form, common in South America and Oceania, although not universal in any of these areas. (Retzius 1901, p. 26; Wölfel 1925, pp. 19—21; Linné 1938, p. 58; etc.)

The early chroniclers, who left such fragmentary information on the knowledge of the

Inca astronomers, seem to have taken even less interest in the practice of trepanation among the aboriginal Peruvian surgeons, as they seem to have made no comments whatever on this unique surgical art. Yet the operation was fairly common all through Inca time, as can be judged from the growing somatological collections in modern museums. Squier (1847) was the first to bring a trepanned Peruvian skull to the attention of competent scholars and thereby establish that the operation was successfully performed by the aborigines of Pacific South America. Later Matto (1886) and Lovena (1890) published special papers on the subject of prehistoric Peruvian trepanation in the Medical Chronicles of Lima, while Bandelier (1904 b) brought the area of aboriginal trepanning also into the Bolivian section of the Titicaca plateau, a distribution later supported by his own archæological discoveries (1910, pp. 173—175, Pl. 22), and, as we have seen, by Posnansky's excavations at Tiahuanaco.

Bandelier (1910, p. 174) writes: "I may be permitted here to state what we succeeded in learning about trephining among the Indians of the Sierra in Peru and Bolivia. My researches among printed or manuscript sources of early times have been fruitless up to date. But we have been assured, by parties not unworthy of credit, that the practice of trephining, and afterward closing the orifices with a *piece of gourd*, is still in vigor among the Indians of high Peru. We were told that the operation is and was performed by persons without any instruction in surgery, and in order to remove splinters from broken skulls. In regard to the instruments used, our informants knew nothing, but they declared to have seen individuals who survived the operation for many years, with a piece of *mate* (gourd or squash) in their skulls, over which the skin had been stitched together. A friend of mine, Don Antonio de Ocampo, told me that in one of his rambles at Ancon, on the Peruvian coast, he stumbled over something that proved to be a skull which protruded from the soil. Picking it up, he saw that a foreign substance was inserted into the bone. It turned out to be a thin disk of *mate* closing an orifice. The skulls we found at Kea-Kollu Chico differ from many other trephined ones in that the opening is *circular* and surrounded by a *depression.* This depression seems to indicate the insertion of a thin plate, as mentioned in the account given us of the operation, as well as in Señor Ocampo's description of the specimen from Ancon. ... Trephining is a very ancient practice, and the artifacts that accompany skulls are, nearly all, of the type which the Indians declared to be pre-Inciac." In a note Bandelier (*Ibid.*, p. 241) also quotes a passage written by Hill in 1860, describing a knobbed Peruvian war-club at Cuzco; Bandelier adds: "The Doctor [Bennett] had examined many skulls of embalmed bodies which seemed to have been broken by this instrument, and were *actually repaired with calabash.*" (Italics by Bandelier.) Skulls with the trepanation opening covered by thin plates of hammered gold are also found in Peruvian desert graves, and such a specimen from Paracas is illustrated by Stewart (1950, Pl. 10).

In his paper on "The Healing of Trephine Wounds in Skulls from Pre-Columbian Peru", Rogers (1938, p. 333) shows upon examination of sixty trepanned skulls that: "...the thirty-seven skulls showing advanced healing embody in many cases not only healing of the scar, but definite formation more or less of new bone tissue within the trephine aperture."[1] He says, too (*Ibid.*, p. 325): "There seems little doubt that the Peruvian surgeon's kit was equipped for the most part with stone instruments. Furthermore it is highly likely that these were of unspecialized character, being in the form of crude flakes and chips of flint, obsidian, and quartz. Copper knives may have been used in some of the later operations, but doubtless not often enough to influence the character of the customary bone wound."

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[1] Ackerknecht (1947, p. 34) writes: "For Oceania, survival has been estimated by observers as high as 50 or even 80 or 90 percent. For Peru, Mc Gee concludes from his series of skulls a survival rate of 50 per cent, which is equal

Freeman (1924), in his paper on "Surgery of the ancient inhabitants of the Americas", describes the actual operation of trepanning as judged partly from historic observation in the Titicaca area, and partly from the excavation of the prehistoric surgeons' instruments. We learn that the patient's head was held tightly between the surgeon's knees, the former reclining, the latter sitting. With a sharp blade, commonly of flint set in a short wooden handle, the surgeon made a cross-shaped incision in the scalp and exposed the skull-bone. The cranial roof was penetrated by the surgeon bracing the handle against his own chest and rubbing the edge backwards and forwards along the skull-bone. A sudden penetration of the brain was prevented by the increasing thickness of the instrument away from its cutting edge. When the grooves around the intended opening were sufficiently deep, the resulting "button" was pried out of its bed, and the brain left open. Freeman (*Ibid.*, p. 22) then writes: "Sometimes the holes were closed with plates made from shells and various other substances."

Further (p. 23): "In the Museum of Anthropology, Balboa Park, San Diego, are a number of trephined Peruvian skulls which illustrate the method of operating and indicate that the procedure was not confined to fractures, but also was employed for various other conditions, such as tumor of the brain and disease of the frontal sinuses. One of these specimens has in place a perfectly preserved device which may have been used to control hemorrhage from the scalp. It consists of a long cord wound several times around the base of the skull, just above the ears, and also across the top of the head, from one ear to the other. [See Plate LXXXV **2**.] This is so arranged that by pulling upon a loop in the occipital region the whole contrivance can be cinched up to any desired tightness. The strands of cord passing over the vertex of the skull are inclosed in a roll of cotton covered with gauze, which may represent a surgical dressing, especially as it is discolored with what looks like old blood. An extremely interesting feature of this dressing is the materials of which it is composed, which in texture compare favorably with those found in our hospitals today. The cotton is soft and white, while the gauze is even finer than our own. The remarkable fact that both cotton and gauze were in use then, much as they are now, indicates that these prehistoric surgeons were not tyros in their profession.

"*Operation for brain tumor.* Another specimen shows that trephining was sometimes done for tumor of the brain. The tumor was as large as a small orange and was situated in the left cerebellar region, as indicated by a marked bulging of the skull at that point." [See Plate LXXXIV **3**.]

In closing his survey of surgery in aboriginal America, Freeman concludes that the centre of trepanning in the New World was early Peru and adjoining territories on the western coast of South America, only a few trepanned skulls having been found archæologically in the territories north of the Isthmus. Looking for the origin of this remarkable

to European results in the second half of the 19th Century. The results of Tello and Mc Curdy are even more favourable."

surgical operation, the author (*Ibid.*, p. 25) is therefore led to suggest that the local culture-people "came to Peru directly across the Pacific, by the help of islands, which formerly were more numerous in the eastern part of the ocean than they are now. This is rendered all the more probable when we remember that trephining is common, even today, among the insular inhabitants of the Pacific."

To the present writer the occurrence of surgical trepanning on the islands in Melanesia and Polynesia would seem to present more of a problem than the presence and origin of such an art among the outstanding high-cultures of continental Peru, and on the whole little seems to be gained by pushing the hypothetical origin of trepanation out to the small Pacific islands, where the custom comes to an end thousands upon thousands of miles short of the next trepanation centre in the early Mediterranean world. Yet several writers follow Freeman in suggesting that the more primitive island tribes brought their craft with surgical experts up against the wind to introduce the custom into American high-cultures. Nordenskiöld (1931, p. 30) writes: "Trepanning is another very important culture element which is considered 'Oceanian' in America. It is known from very ancient Peruvian graves, e.g. from Paracas, where Tello has discovered trepanned skulls in great abundance. It is quite evident that in America trepanning mainly occurred in western South America. As to the age of this custom in Melanesia, whence it is supposed to have most directly reached America, we have no knowledge. From Melanesia we only know it in modern times. It would have to be of an exceedingly great age there, naturally, if imported into America long prior to the time of the Incas. However that may be, from what we do know, the Indians appear to have surpassed their 'teachers' in operative skill."

One cannot help feeling that if the scattered down-wind islanders were "pupils" rather than "teachers", the whole problem would be solved so much more naturally.

Wölfel's trepanation culture complex

The most thorough study on the subject under discussion is the publication by Wölfel (1925) already quoted, on the origin, relations and cultural associations of trepanning. After showing that the practice of trepanation has two main world centres, namely Europe-North Africa and America-Oceania, Wölfel devotes most of his attention to an analysis and demonstration of "The Cultural Relations and Mutual Origin of Trepanation in Melanesia and America." In a detailed and careful comparison of the operation itself, its purpose and whole execution, Wölfel (*Ibid.*, pp. 1—40) presents convincing evidence in support of a direct source relationship, and says himself of aboriginal American trepanation: "As far as the parallels to the Pacific islands are concerned, these are present in such quantities as I had hardly ventured to expect. In consideration of the trepanation alone, and without regard to the other accompanying elements, the cultural unity behind these phenomena in America and the Pacific may be considered as proven. We shall see further on, however, that the elements which organically run parallel with trepanation are also identical even in small details in America and in the Pacific."

Wölfel then pursues the problem still further, and demonstrates that the American-Oceanian distribution of the trepanning custom coincides essentially with the American-Oceanian area in which the sling and certain skull-breaking clubs and stone-headed maces were important fighting weapons. While the spears, lances, swords, daggers and other sharp-pointed missiles or cutting blades prevailed in Indonesia and continental Asia, the truly Oceanic peoples and also several tribes in Melanesia made use instead of such early Peruvian fighting-weapons as the sling, wooden paddle-clubs, and even the peculiar star-shaped (and in Mexico pineapple-shaped) stone maces. These were weapons not intended for internal injuries, but primarily for causing cranial damages that would require surgical treatment of the skull.

Wölfel (*Ibid.*, p. 15) shows that the sling in reality is a very specific culture element, and one to which ethnologists have generally paid very little attention. He shows that three types of slings present in the trepanation area on the Pacific islands all concur with the sling-types known from early Peruvian graves. He writes (*Ibid.*, p. 42): "Friederici emphasises the resemblance between the Baining and Tumuip slings [of the Bismarck Islands] with slit cradles, and the corresponding type of Peruvian slings. The Peruvian type with pocket cradle also he declares to be quite similar to the corresponding South Sea type. The Peruvian band sling with a widened section as cradle has always the hole at one end—typical of the South Seas—through which the little or middle finger is put. Also the other South Sea type with guard for the end held in the hand is present in Peru, namely with the attached mother-of-pearl disc. As for sling stones, their shape is identical in the South Seas and Peru as regards the long roller-shaped form with pointed ends; at the same time other shapes occur, which also are designated as sling stones. I belive that, despite the scantiness of the material relating to slings, the extensive and definite agreement which nevertheless exists is a sure proof of cultural connection."

The author also points out (*Ibid.*, p. 17) that the custom of wearing the sling as a head-band was common to the trepanation area of Peru and Oceania. (See e. g. fig. **9**, page 313.) Finally, in text and illustrations, he calls attention to the well-known resemblance and often identity between the highly specialized star-shaped stone-maces excavated from Titicaca Island in the Andes to the Pacific coast of Peru and Ecuador, and reoccurring so strangely in the hands of several Papua Melanesian aborigines,[1] as does the pineapple-shaped mace-head of Mexico also. He includes these skull-breaking maces in his trepanation study, as he says, "because they demonstrate particularly clearly and incontrovertibly the connection between the American and the Melanesian distribution area of trepanation." (*Ibid.*, p. 17.)

Unlike most American-Oceanian diffusionists, Wölfel does not jump to the hasty conclusion that the suggested diffusion must have gone up-wind from the Oceanic island tribes to the continental realm of Peru. He omits any theory of migration method or migration direction, and simply states in his own conclusion (*Ibid.*, pp. 46, 47): "We have been able to ascertain, not only a complete unity in method and indication of trepanation in the Pacific and America, but we have even found that phenomena which had remained unexplained if considered in the Pacific alone, received their explanation from America, and, the other way round, the much richer testimony of the Pacific Islanders afforded an explanation of phenomena which were observed in America on dumb skulls. In itself trepanation suffices to furnish the indisputable proof of the cultural unity of this phenomenon. ... The wooden paddle-club and stone-knobbed mace as well as the sling, belong organically to trepanation, and confronted with the fact that the whole cycle of variation of the clubs covered the area of certain definite sling-types and most probably concured with the distribution area of trepanation in the Pacific and in America, ...it can hardly be denied any longer *that this cultural complex is of a single origin, and migrated as a complex*."

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[1] For Titicaca Island see Bandelier (1910, Pl. 30); for the coast of Peru see Nordenskiöld (1931, p. 21). See also Steward (1946, Pl. 144) for its occurrence among the Diaguita of the southern Andes; and Henshaw (1887) for its American-Oceanian analogy.

Wölfel's work has frequently been quoted, but there has never been any direct challenge to his conclusions. Linné (1938, p. 59) agrees with Wölfel that trepanning seems associated with the use of the sling and the stone-headed mace, since the same methods, together with such weapons, concur in the trepanation areas of America and the Pacific islands. But he feels that Wölfel is "rash" to deduce a cultural unity between America and the Pacific islands solely on the basis of the evidence presented by the trepanation complex. Linné's reason for this judgement is (*Ibid.*): "The third area of distribution, viz. Europe, is still awaiting explanation, and it is not proved that trepanning is of greater age in the South Sea islands than in America. Its sporadic occurrence in America speaks in favour of this custom belonging to the earlier culture elements, which, if imported from the Pacific islands into the Peruvian coast region, must have reached North America via the Behring Strait."

Inasmuch as Wölfel carefully abstained from concluding that the trepanation complex was imported from the Pacific islands to the coast of Peru, the great antiquity in Peru of trepanation and its cultural associates is not a valid counterargument to Wölfel's diffusion claim, but merely a positive argument indicating that the diffusion might have gone down wind into the island realm *from* Peru. Nor does the sporadic occurrence of trepanning in North America prevent Peruvians from having exported it from their own coast. The existence of a second trepanation centre on the other side of the Atlantic is not a proof or even an indication that the Peruvians did not introduce the custom into the Pacific. Trepanation in the Atlas countries and the Canary Islands may well be wholly unrelated to the sporadic occurrence of the custom in the New World, and yet again there is nothing that could prevent it from crossing the Atlantic together with the Old World gourd, which was used in early Peru for making cover to some of the trepanation openings. Irrespective of what may or may not have happened in the Atlantic basin, we have ample evidence to suggest that the Peruvians brought trepanning and its associates down-wind into the Pacific at an early period when Polynesia was still virgin land. The strongest evidence has survived on both sides of Polynesia, but although this latter intervening area has later been overrun by another immigrant stream, some islands, like Fatuhiva, Hivaoa, and Nukuhiva of the Marquesas group, Tahiti and Borabora of the Society group, New Zealand, and Fiji of the border territory, present sufficient evidence to show that the trepanation bridge formerly spanned the whole water from the coast of Peru to the islands in Melanesia.

The venesection bow

Unimportant, unless as a pendant to the distribution pattern of the trepanation custom, is the American-Oceanian use of the venesection bow.

Ackerknecht (1947, p. 29) says in his paper on primitive surgery: "Venesection is not very frequent and is mostly found in America; though in some places the technique may be adopted from the whites—at least for Peru it is certain that the custom was pre-Columbian. Venesection is found occasionally in Africa and Oceania."

The first illustration of natives using a venesection bow for medical purposes comes from the Panama isthmus, where Wafer (1903, p. 28), a seventeenth century surgeon, took sufficient interest in the strange operation to describe and illustrate the performance as "The Indians mãner of Bloodletting."

The venesection bow is a miniature bow of the sort used in Polynesia for hunting rats, and from it a tiny arrow with a sharp and delicate point is shot at close range against the vein of the patient to let out supposedly bad blood. Nordenskiöld (1931, p. 31) writes: "A culture element already pointed out by Heger as being 'Oceanian' in America is the venesection bow. Its peculiar distribution in America points to a great age. The venesection bow occurred and occurs among the Cunas in the Isthmus of Panama and among some few Gês tribes in eastern Brazil. It is possibly also found elsewhere, although it may have escaped the attention of explorers."

As Müller (1936, p. 243) shows, the complete concurrence between the South American and Oceanian form was demonstrated at the Medico-Historical Exhibition in Vienna, where two of these instruments (respectively from Brazil and East New Guinea) were described as "pieces corresponding down to the details."

Steward (1949, p. 744) also, in his *Handbook of South American Indians,* is of the opinion that the venesection bow, as well as the art of trepanning and the star-headed clubs, are among the special American-Oceanian culture elements which "might be argued with some plausibility to have been invented only once, but it would still be necessary to prove that they were earlier in the Old World than in the New World and to show how they could have reached America." They could not, indeed, have reached America up wind across the vast Pacific. Nor do we here suggest that the venesection bow, trepanation, and star-headed maces were earlier in the Pacific than in America, which they were probably not. But we feel there is the more reason to suspect a diffusion down-stream.

Mummification

Many strange theories have been launched about the existence of artificial mummification in Peru and Oceania, and much unjustified scepticism has been the natural consequence. Dixon (1928, p. 251) has duly shown the absurdity of such extreme diffusionist ideas as the suggested spread of mummification from Polynesia to Peru following an original introduction into Polynesia by migrants from Egypt. One of his arguments against this fantastic idea will here suffice, namely, that true mummification is known nowhere in the whole of Indonesia. (*Ibid.*) On the other hand, he admits that mummification does occur in the East Pacific, as in Easter Island and the Marquesas group, nearest Peru. (*Ibid.*, p. 252.) We may add, as Henry does (1928, p. 295) that the art of embalming selected persons of important rank was also extant in Tahiti when discovered by Europeans. Three *tapua miri*, or professional embalmers, were still living on that island when the missionaries arrived. The bodies to be mummified were opened and filled with oiled tapa; even the brain was removed, and the skin was rubbed with oil and finally sun-dried. Captain Cook (1784, Vol. II, pp. 52, 53) also states that the local mummification oil was mixed with sea-water and "the juice of a plant which grows amongst the mountains." When the hair chanced to fall off it was carefully placed back with gum. (Henry, *loc. cit.*)

Linton (1923, p. 456) states that the mummification in the Society Islands, and also in the Marquesas, included "evisceration by anus and rubbing with coconut oil." He shows (*Ibid.*) that this Society Island custom was practised also in Samoa, but by one family only.

Fornander (1878, Vol. I, p. 106) writes from Hawaii: "There the older and more general manner of disposing of the dead was to embalm the body, or rather cover it with a glutinous wash made from the Ti-root (*Dracæna terminalis*), which effectually sealed up the pores of the skin and excluded the air. The body was then deposited in a sitting posture in a cave on the mountain-side, or on some natural shelf or niche on the side of a precipice."

Reischek (1924) similarly writes from New Zealand: "In early days the dead bodies of the important chiefs were mummified..." According to Linton (1923, p. 456), this was again done by evisceration by anus and rubbing with oil, as in the Marquesas and the Society Islands, but with the added effect of smoking. We may suspect that royal persons in ancient Tonga also were properly mummified, for, as St. Johnston (1921, p. 243) shows, during his early stay there Mariner saw a megalithic vault "capable of holding thirty bodies, and he remarks that when it was opened there were one or two corpses there that looked as well preserved as the day they had first been put in."

West of Polynesia, purposeful embalming is reported from parts of Australia, but these primitive tribes were certainly not the instructors of the Polynesians. A further complex of concurring traits would be necessary to suggest contact with these peoples.

As we have shown in Part II, mummification is not the normal form of burial in Polynesia, and where it occurs it seems to be almost entirely reserved for royalty or persons of high rank. The wide spread of the custom, and its absence from the whole of Indonesia, make us again suspicious of a possible introduction from South America. We should note that the damp tropical climate of an island like, for example, Tahiti is exceedingly unfavourable for the preservation of bodies against the very rapid decay that begins almost instantly after death. This is an essential environmental factor to be taken into consideration for those who speak of the inferiority of the local mummies when compared with those of such perfectly dry desert countries as, for instance, Peru and Egypt. We ought to bear in mind that when Captain Cook (1784, Vol. II, p. 52), in spite of the moist and warm local climate, saw a mummified Tahitian king who had passed away four months earlier, the mummification process must have been quite elaborate, probably as much so as the one employed in ancient Peru, where very little artificial care was needed to make it possible for the mummies of the pre-Inca desert burials to remain intact until modern times.

Dawson (1928, p. 122), whose authority on the general unchangeableness of the soft, wavy auburn hair on some Peruvian mummies has already been quoted, shows that it is a common belief that the preservation of mummies in Peru is due to the unaided forces of nature. This may be so, he says, in many cases of burial in sand or nitrous soil, but it is still abundantly clear in many other cases that artificial methods of embalming have been resorted to. He states that (*Ibid.*, p. 124): "...mummies have been found in which the pelvic viscera had been removed *per anum* by incising the perineum, and that in some cases also resinous and oily preservations had been employed." He similarly writes of a local mummy which he had personally examined (*Ibid.*, p. 126) that "the body had been partially eviscerated *per anum* and the whole surface treated with preservation material." The mummy of an adult woman with light brown hair brought to the Anatomical Museum of Edinburgh University from near Iquique, Chile (a hundred miles south of the Peruvian border) proved to be "carefully and elaborately embalmed." (*Ibid.*)

The Paracas mummies were artificially embalmed ,which has been revealed even by their blood tests (Candela 1943, p. 65), and the custom survived, but only among the royalties of Peru, right through the Inca dynasty. (Dawson 1928, p. 123.)

To summarize: Artificial mummification was widespread among royal families in Polynesia, where it is recorded from Easter Island, the Marquesas, the Society Islands, Hawaii, New Zealand, Samoa and probably Tonga. The unfavourable climatic conditions for lasting preservation of organic matter, combined with the widespread local attempts, do not indicate that this ancient art was invented independently in these various parts of Polynesia. Nor does the absence of the custom in Indonesia indicate that it spread from the Old World. But if we turn to the Pacific coast of South America we find, in the same area where the numerous other parallels have accumulated, that this was also an early distribution area for systematic mummification. We even find that the ancient Polynesian royalty followed the pre-Inca Peruvians in their method of embalming — eviscerating the mummies by the anus and treating their surface with an oily composition. As far as the islands in the East Pacific are concerned, we need, therefore, not resort to fantastic theories to bring mummification in from antipodal areas like Egypt, and although the same custom and method were practised in the Canary Islands, we are not, in the Pacific area, involved in any question of whether or not mummification may have reached America from across the Atlantic.

Music

Stringed instruments

The world distribution of the basic forms of musical instruments has been the subject of considerable attention. In his review of "America and the Old World", Boas (1925) defends the hypothesis that the cultures in the New World arose independently of any inspiration from the rest of the world, and to support his argument he points to the basic peculiarities in the field of music. His conclusion is (*Ibid.*, p. 26): "A fundamental difference occurs also in the form of musical instruments. In the Old World, excepting the farthest outposts in Australia and on the Pacific Islands, stringed instruments are found everywhere. ... On the other hand they are entirely absent in America." The same author (*Ibid.*, p. 28) also refers to "the analogous foundation of American and Polynesian music," which Hornbostel (1911) had already pointed out in his paper on an acoustic evidence for a local cultural relationship. But no attempt is made by Boas to follow the case of the stringed instruments to its logical consequence. It would be natural to argue that, if the absence of Old World stringed instruments in America is a valid argument against diffusion from the Old World to the New, then their absence also in Polynesia must necessarily lead to an identic conclusion.

Roberts (1926, p. 329) states that: "...the region lying between the Malay Peninsula, the islands of Borneo, Sumatra, and Java, on the one hand, and Burma and India on the other, is preeminently the home of stringed instruments which show practically all stages from very simple bow types to the most ornate many-stringed members of the guitar and violin families." She shows (*Ibid.*, p. 343) that, from a principal world centre in Indonesia, stringed instruments with resonators were widespread westwards through the continent of Asia as far as Africa, while eastward they were found as far as to Melanesia, but no further. They were probably introduced to the *eastern* parts of America by negroes in post-Columbian times, but she says (*Ibid.*, p. 342): "They do not occur on the west coast nor in the Pacific east of Melanesia."

Although stringed instruments with resonators are definitely absent from both aboriginal Polynesia and South America, the case of the more primitive "musical bow" is not quite so clear. In his work on *Musical and other Sound Instruments of the South American Indians*, Izikowitz (1935, p. 202) shows that the question whether or not the simple form of musical bow existed in pre-Columbian America "has been the subject of quite lively discussion." He states (*Ibid.*): "If this instrument is pre-Columbian it would in that case be the only stringed instrument known in America before the arrival of Columbus." The author reproduces an illustration from Ten Kate which shows a Patagonian in western South America playing the *koh-lo*, a single-stringed musical bow, during the playing of which the end of the short bow is held against the Indian's mouth.

This simple musical bow without resonator is also recorded in Polynesia. Although Linton (1923, p. 410) claims that its local occurrence is restricted to Hawaii and the Marquesas, Roberts (1926, pp. 322—346) in her review of its distribution states that it was also used in a primitive form in Raivaevae, and that the Maori formerly had a single-stringed musical bow called *Ku*, that has almost become legendary. She considers the Hawaiian musical bow with sometimes one, sometimes two or three strings as a type specialized locally after its introduction to Hawaii, and thus only remotely resembling the more primitive musical bows of the Marquesas, Raivaevae and New Zealand. She states that the Hawaiian musical bow was played with one end placed between the lips. Handy (1923, p. 313) similarly writes of the one-string musical bow of the Marquesas group: "One end of the instrument was held in the mouth, the other end, extending out to the side, being held by the left hand. The string was plucked with the right hand."

This method of playing the musical bow in the Marquesas group and Hawaii was, as we have seen, the very manner in which the South American *koh-lo* was played. Roberts (1926, p. 335), partly quoting Ten Kate, compares this American one-stringed musical bow without resonator (with its Tehuelche name *koh-lo*) to that of the Solomon Islanders, who have the same instrument and call it *kolove*. She also mentions that its Maya name was *hool* and the Maori name *ku*. (*Ukeke* in Hawaii, *Utete* in the Marquesas.) She finds it more likely that the simple South American bows have a connection with those of the Pacific Islands than with those of North America, although she finds striking similarities between the musical bows of Hawaii and those used by the Pomo and Maitu Indians of North America.

All told, the elementary facts found in a survey of stringed instruments in the Pacific area not only serve to separate the continental Americans from the cultures of aboriginal

Asia, but the Polynesians directly follow the Americans. Indeed, the available evidence is again closely analogous to what was found for the first time to such a marked degree in the Pacific distribution of the B blood factor. The Malay Archipelago and the adjoining continent, which showed the world maximum of the B factor, now represent the aboriginal world centre for all the many varieties of elaborate stringed instruments with resonators, whereas America and Polynesia form the very opposite extremity. Whereas stringed instruments with resonators are totally absent from the aboriginal culture areas of South America and Polynesia, instances of a simple musical bow are on record from both these areas, and in both regions this simple instrument is played with one end of the bow held to the mouth.

Wind instruments. The nose-flute

A number of flutes, whistles and other wind instruments, including a single-note trumpet, made up for the remarkable scarcity of stringed instruments throughout Polynesia. These were at proper occasions accompanied by singing, and by the rhythmic beating on drums.

In his work on *Maori Music, whith its Polynesian Background*, Andersen (1934, p. 260) deals at length with the wood and bone flutes of New Zealand, and for direct comparison he introduces a description of similar flutes in Peru. But we shall here first turn our attention to a peculiar custom in the use of some of the Polynesian flutes—that of playing the flute with one of the nostrils instead of with the mouth. This strange custom was widespread on some of the islands in Polynesia, and it was also used by some of the peoples in Indonesia. As Roberts (1926, p. 348) shows, it has been claimed (by Tylor, Engel and Day) to have originated with the Brahmans who, because other of lower caste played flutes with the mouth, could not allow themselves to be defiled by doing the same. But, if the custom originated with the Brahmans, we cannot suppose them to have sent the nose-playing to Polynesia, without the Brahmanistic teachings and cultural level.

Nor is it necessary to cross Austro-Melanesia and thus resort to the Brahmans and their pupils for the origin of the Polynesian type of nose-flute. Both Linton (1923, p. 453) and Buck (1930, p. 678) point out that inside Polynesia the nose-flute has its distribution specifically in the eastern area of the islands, that is on the groups next to Peru. Now Izikowitz (1935, pp. 327, 328) shows that the nose-flute also existed in aboriginal Peru, although more rarely than elsewhere in South America. He also mentions certain archæological flutes from the coast of Peru, the handling of which we naturally know nothing, but which through analogy with certain historically used flutes among the Jivaros may be suspected to have served as nose-flutes.[1] He says of South America in general (p. 327): "We have on various occasions noted that *many different* kinds of flutes are blown with the nose. Nose-blown flutes occur among: the Jivaro, Kaingang and Botucudo, Paressí and Nambicuara, Apinayé, and in Guiana and California. Furthermore, Perez informed me that the Cunas blow with the nose, although not on a flute but in the hands. How this is done I do not know. Has nose-blowing been invented in several places in America, or is there any connection?" His own answer is (p. 328): "... we have an indubitable connection between the South American nose-flutes. They are evidently very old flutes which all derive from the same pristine instrument—the resonator whistle with two stops." Further (*Ibid.*, p. 330): "Sachs (1928, p. 117) and others—among them Pater W. Schmidt—are of the opinion that the nose-flute has been introduced from Oceania, and I must admit that the Polynesian and South American nose-flutes have much in common. The former are alternately transverse and end flutes, occasionally the blow-hole is placed in the proximal septum as among the Botucudo and Kaingang, and several (on Tahiti) have a bilateral position of the stops as in Guiana and among the Kaingang and other tribes." He states that Foy "considers it a very late instrument in Polynesia" on the ground that it does not exist in Melanesia, and that Sachs also is of the same opinion.

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[1] Carlos Vega, musicologist of Museo Nacional de Historia Natural, Buenos Aires, also states that the nose-flute was known in the Andean region. (Andersen 1934, p. 265.) For illustration of nose-flute playing among the Botocudos of Brazil, see Keane (1883—84); and from the Marquesas Islands, see Heyerdahl (1941 a, p. 125).

Combining these statements with the fact that he himself found the nose-flute in South America to be of very great antiquity, Izikowitz (*Ibid.*) assumes a sceptical attitude towards the possibility of contact, in spite of the observed similarity between the Polynesian and South American form, and he merely stresses: "On the whole, the chronology must agree if we are to presume a pre-Columbian 'transpacific trade' of culture elements." We need only point out that the chronology does agree if the East Polynesian nose-flute came to the islands from the old prototype forms of South America.

The gourd whistle

Izikowitz (*Ibid.*, p. 286) also shows that gourd flutes or whistlers are known in various parts of South America, some of which were also blown with the nose. Outside South America, gourd whistles are only known in Polynesia, Melanesia and Indonesia. (Roberts 1926, p. 348.) Of course the local antiquity of this whistle must follow the local antiquity of the gourd, *Lagenaria siceraria*, from the rind of which it is made. We have already seen in Part VII that the gourd first was cultivated in Peru two or maybe three thousand years before the beginning of Polynesian history and the first human voyages between the oceanic islands of the Pacific. Did the idea of the nose-flute follow the gourd and the gourd-flute down-wind across the Pacific? Through Bird's fortunate discovery we know that on the Pacific coast of South America the gourd whistle must be almost as old as the gourd itself. Whitaker and Bird (1949, Fig. 2, p. 7) illustrate a "spherical fruit of *Lagenaria siceraria* made into a whistle," which was excavated among "Cupisnique" debris in the very ancient Huaca Prieta midden of North Peru. This means that the gourd whistle was used in Peru long before the rise of the Early Chimu empire. This early prehistoric specimen was made of a gourd not quite two inches (47 mm) in diameter.

Roberts (1926, p. 348) states that *small gourds* were made into whistles in Hawaii, Tahiti, and New Zealand, and she draws attention to their parallel appearance in Peruvian graves and among some historic tribes in other parts of South America.

The nguru or up-turned flute

A rather unique form of wind instrument, the so-called *nguru* or up-turned flute, is found among the Maori in New Zealand. In his monograph on *Maori Music*, Andersen (1934, p. 264) gives this instrument considerable attention. He states:

"The nguru has been recorded from no other part of Polynesia than New Zealand; I was therefore much interested when I saw it mentioned as an ancient Peruvian instrument in a paper published by the American Museum of Natural History. The author of the paper (Mead 1924, p. 337) writes: 'It is a new style of flute to me, in as much as the lower end is turned up at a right angle to the body of the instrument. It is of the end blown type, 8¾ inches long, and has five vents on the upper side, also one for the thumb on the under side, between the fourth and fifth vents above. ... The flute is of black ware, and, as the photograph shows, is decorated with incised designs on the upper side, and has a puma figure near the upper end. This puma was moulded and attached to the instrument before firing. It is a powerful instrument, and its tones, although so loud, are not disagreeable in quality.' The instrument is about three inches longer than the Maori nguru, but excepting this and the ornamental head, the shape and qualities of the instruments are identical,... The fact that what looks like the prototype of the nguru is found in Peru—and the terracotta specimen described by Mead above was found in a prehistoric grave at Ica, in Peru—raises again the interesting question—Is there any evidence that the Polynesian reached the continent of America? ... I enquired of the British Museum, but was informed that they have no record of the nguru elsewhere than from New Zealand. Seeing that there was a similar instrument in Peru, and that the Maori instrument follows the Peruvian in being often made from stone, it would seem likely, supposing contact to have taken place, that the Polynesian Maori brought the nguru from Peru in a back-splash as it were rather than he took it there."

Emory (1942 b, p. 132), in criticising the value of certain of Nordenskiöld's Oceanian-South American parallels, points out that he might instead have *added* to his list, as a more solid and striking parallel, this up-turned flute peculiar to New Zealand and Peru.

The parallel between the Maori *nguru*-flute and the pre-Inca specimen from Ica becomes even more apparent when we note Fisher's description (1937, pp. 111–115) of some archæological Maori specimens which, like their earlier Peruvian prototype, were made of terra cotta. He writes: "Materials used included fine and coarse grained sandstone, rhyolite and what appears to be baked clay. It is generally understood that the Maori did not bake clay for domestic vessels, but clay was apparently treated in some manner, either dried in the sun or wind, or possibly baked with heat from a fire." An added correspondence to the Ica specimen is found in the fact that a stylized face stood out in high relief on several of these Maori *nguru*-flutes, just as on the early Peruvian counterpart.

The pan-pipe

In Polynesia the nose-flutes are recorded essentially from those areas where the pan-pipes were not in use, and vice versa. Thus, whereas we found the nose-flute to dominate the eastern groups, the pan-pipe seems to have survived only among the Samoans and Tongans (Söderström 1939, Pl. 16) in the west. Yet this instrument, made of a series of parallel reeds graded in length to form a scale, was common not only in Melanesia, but also in the whole Andean area of Peru, Bolivia and Ecuador.

Now, various forms of pan-pipes or syrinx are known in many parts of the world, amongst other localities also in Java. But Hornbostel (1911, p. 612) writes: "In surveying the multiple forms of pan-pipes and their world distribution, one cannot overlook one strange fact, namely that the types with double rows—that is such as have an open pipe together which each closed one (of about the same length) to give the octave—only exist in two limited but widely separated territories: in the Solomon Islands and western Polynesia (Fiji, Samoa) on one side, and in Peru (even pre-Columbian) and Bolivia on the other. Even the characteristic ligature of the Solomon Island pan-pipes—that is flat sticks with threads strung crosswise—reappears in South America (Peru, Brazil)." After testing and analysing the acoustic qualities and vibration number in the tones of a series of Solomon Island and Brazilian pan-pipes, Hornbostel (*Ibid.*, p. 615) wrote in conclusion: "The correspondence is even so complete and so exact as in none of the formerly observed analogous cases, and it is to be hoped that the cultural connection here ascertained may be verified through the discovery of further occurrences of cultural parallelism."

Hornbostel's opinion of this American Oceanian connection, based upon his own study of the pan-pipes, was strongly attacked by Mead (1924, p. 333). But the basis for the attack was that Hornbostel's comparative tables of Brazil-Solomon Island vibration numbers were too much alike—so much alike, in fact, as to look unnatural after centuries of mutual isolation. The correspondence thus appeared to Mead as merely "a very remarkable coincidence." Mead found personally no such complete agreement when he compared the vibration number of two pan-pipes *both* of which were from Brazil, and his claim of coincidence, therefore, seems well supported. But this refers merely to the astounding *degree* of correspondence pointed out by Hornbostel. It is at no rate a very successful argument *against* a source relationship between the musical instruments under discussion. Nor is Mead justified in assuming that the pan-pipe analogy constitutes some sort of a foundation stone in the claims of American-Oceanian contacts. He remarks (*Ibid.*): "Of late years several anthropologists have turned their attention to the South Sea Islands, believing that they have discovered convincing evidence of cultural connection between their peoples and those in parts of South America... the most striking argument in support of this theory deals with the old Inca musical instrument, the pan-pipe, ..." If there were no better and more striking argument, we could have admitted that the argument of the double-row pan-pipes was a somewhat vague foundation for theories of trans-Pacific voyaging. But the pan-pipes do not stand alone.

After Mead's attempt to nullify the value of Hornbostel's view, the attention given to the subject has certainly not diminished. Thus Andersen (1934, p. 270), in his monograph on *Polynesian* musical instruments, points to the West-Polynesian pan-pipes and the marked conformities to be seen in *Peru*, while Izikowitz (1935, p. 404), in his monograph on *South American* musical instruments, points out that the local form of pan-pipes reappears on the *Pacific islands*. He maintains: "Strangely enough we also find not only similar tone systems, but also the same pitches."

Nordenskiöld (1931, p. 30), who believed that the *Lagenaria* could have been carried to ancient South America with some weather-driven Oceanic crew, also suggests that some few other "Oceanian" culture elements may have arrived in the same company. He writes: "A culture element of this category may be the pan-pipe, which by many writers is considered to have been imported from Oceania. The pan-pipe occurs with the earlier ceramics in Nazca, and then in a highly developed form. Its variation as to form among different

South American tribes has since become very considerable. The pan-pipe did not, however, at the time of the Discovery occur in Central or North America,[1] or in the Antilles... [Italics by Nordenskiöld:] *Whether the pan-pipe possesses great antiquity in Oceania we do not know; but upon this naturally depends the possibility of its having been introduced from there into America. Rightly or wrongly it is always assumed that the 'Oceanian' culture elements are of greater antiquity in Oceania than in America. I cannot see why this should be taken for granted.*"

We agree, but find it difficult to see why the possibility of a diffusion the other way is not then taken into consideration.

The single-note trumpet

For use on ceremonial occasions, and especially during warfare, a single-note trumpet made of a large conch-shell was used in many parts of the Pacific hemisphere, and it is only included here for the sake of its importance in early Polynesia, where it had been introduced as the customary war-trumpet even on a lonely speck like Easter Island. (Beechey 1831, p. 35.) Roberts (1926, p. 352) apparently considers this instrument of sufficient originality to be a possible indicator of migration. She writes: "Far from being universal, the conch shell trumpet has a most peculiar, if wide-flung, distribution which it is important to consider in connection with that of the other instruments forming this significant complex." She claims that the conch was not made into a trumpet in Africa, Assyria or Persia, but in ancient Crete and among some other early Mediterranean cultures on the one side, and in India on the other. But in India the conch trumpet was supposedly introduced by the god Krishna, a great deity of later Hinduism. She shows (*Ibid.*, p. 355) that according to old Spanish accounts the conch was part of the ceremonial equipment of the Aztecs of Mexico, and states (p. 357): "In most South American countries and Mexico these trumpets were used, as they were in Polynesia and India, in connection with religious ceremonies." Further (p. 356): "It is quite commonly known that the conch was an ancient Peruvian instrument. It had two names, the *putatu*, undoubtedly the original native name, with which should be compared the Polynesian terms for various kinds of trumpets and wind instruments, and *bosina* which is probably of Spanish derivation."[2]

Rowe (1946, p. 290) writes: "A single-note trumpet made of a large sea shell (*pototo*) was used as a war trumpet by the *Inca*, and is used as a ritual instrument, blown at certain points in the Mass, by the modern *Quechua*."

In parts of modern South America the cow-horn is stated to have replaced the former conch shell as trumpet (*Ibid.*, p. 357; Bandelier 1910, p. 149), and Bandelier (*Ibid.*, p. 93) writes from Titicaca Island: "How often were we, at night, startled by the lugubrious sound of the 'Pu-tu-tu,' a cow-horn, which the Indians blew on the approach of clouds threatening hail, in order to oblige Supay [the devil] and his associates to take another course..." Now, in New Zealand the term *pu* was a generic prefix to blown instruments like trumpets and flutes (Andersen 1934, p. 270), and the conch was known as *pu moana*, or "trumpet of the sea." In Hawaii and also in the Marquesas group, the conch trumpet was simply termed *pu*, and it was known in Samoa as *o-le-pu*. (Roberts 1926, p. 355.)[1]

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[1] The pan-pipe did occur among the aboriginal Northwest Coast Indians. Cf. specimens in the Provincial Museum, Victoria, B. C.

[2] If this is so, the Spaniards may perhaps have introduced to Peru the old Roman name for the same instrument: *buccina*.

Both Nordenskiöld (1931, p. 21) and Emory (1942 b, p. 132) list the conch trumpet among their American-Oceanian culture-parallels.

It is interesting to note with Izikowitz (1935, p. 228) that a conch shell trumpet excavated by Hutchinson (1873, Vol. I, p. 134) at Cañete, on the coast of Peru some fifty miles north of Paracas, was examined by Dr. Nils Odhner, well-known Swedish conchologist who found that "this sea-shell was a *Triton tritonis*, which is never found on the South American west coast."

The nearest points where a sea-shell of *Triton tritonis* could be secured are the islands of the Polynesian ocean.[2] It is therefore especially interesting to note that this particular conch trumpet was perforated for the blow-hole at the side of the apex, as customary in most Polynesian islands, rather than at the end of the apex, as otherwise customary in Peru. Izikowitz (*Ibid.*) also mentions from Peru that "on a specimen from Ijca the edges of the blow-hole are covered with wax." This concurs entirely with a custom in the Marquesas Islands, where I secured in 1937 a large conch-trumpet ornamented with fringes of human hair, the edges of the blow-hole being covered with a waxey organic substance believed by the natives to have been made from some hardened sap.[3] Buck (1949, p. 257) writes from New Zealand: "The Maori trumpet was also made of *Triton* shells but the apex was cut off and a carved wooden mouthpiece was lashed to the opening through holes drilled through the shell and the corresponding parts of the mouthpiece. Some form of gum was evidently used to seal the join."

We have just seen that in India the conch trumpet was supposedly introduced by the god Krishna, and would be unlikely to spread thousands of miles up wind to Polynesia without associated Hindu religious and culture traits. In Peruvian traditions we learn that the great coastal navigator, King Naymlap, was accompanied by a ceremonial conch-blower when he and his balsa raft flotilla sailed down the open Pacific coast to Lambayeque in North Peru, long before the Early Chimu era. (Balboa, MS 1576-1586, Chap. 17.)

When considered alone, the ceremonial conch trumpet is without value as a pathfinder in our study of early Polynesian origins. But as we have seen, the conch trumpet does not stand alone.

We may finally quote from Roberts (1926, p. 349) that: "Gourds were used as trumpets in some parts of the South American continent, and also in New Zealand." Peru was one of these South American localities where the gourd trumpet was in use. (Cobo 1653, Bk. 14, Ch. 17.)

Carved wooden flageolets

Without parallel in Peru is a very interesting Maori flageolet reproduced by Hamilton (1896), Archey (1937), and others. The upper side of the instrument is artistically carved into the shape of a grotesque human head with a huge open mouth in the middle. As Archey (*Ibid.*) states: "The call of carved wooden flageolets is issued through the wide-open mouth of a human face."

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[1] In Peru the pan-pipes were known as *huayra-puhura*, another name compared by Andersen (1934, p. 270) with those for wind instruments in Polynesia.

[2] See G. W. Tryon, Manual of Conchology, Ser. I, Vol. III, Philadelphia 1881.

[3] This specimen, which for many generations had been preserved as sacred inheritance by a native family in Atuona Valley, Hivaoa, is at present in Brooklyn Museum, New York.

Such instruments are also exhibited at the Provincial Museum in Victoria, British Columbia. The latter specimens are also carved wooden flageolets, with the call issued in the same manner through the wide-open mouth of a human face carved on the upper side of the flute. These specimens, which are of Kwakiutl origin, differ from their close Maori counterparts only in the artistic pattern applied to the carving, which in New Zealand bears a marked stamp of the locally predominant style in wood-carving art. Otherwise these peculiar wind instruments are identic in idea and excecution. (Cfr. Part II.)

Drums

Two basically different forms of drums occurred in Polynesia, the skin-covered drum and the slit drum. In the Marquesas group a vertical cylindrical drum was made from a short section of a tree, usually a coconut palm that had been hollowed out and covered with a shark-skin head. An analogous form of drum was also in use in the Hawaiian group, the Society Islands (Linton 1923, p. 453), Peru (Mead 1924, p. 320), and in many other parts of the world. In aboriginal Peru, like in Polynesia, the drums together with the various kinds of flutes and pipes were the most important instruments. (*Ibid.*, p. 346.)

The slit drum—made from a piece of a log with solid ends, but with a narrow slot on one side that leads into a hollow interior—had a wide (but not universal) distribution in Polynesia, from Samoa and Tonga in the west (Linton 1923, p. 453), and the Cook, Society, and Tubuai Islands in the nuclear area (Buck 1949, p. 253), to such easterly outposts as Mangareva, and Raroia in the Tuamotu group where the local villagers entertained the *Kon-Tiki* crew on their arrival with beating on a slit drum. This was also used as a signal gong to call the natives together.

Izikowitz (1935, p. 17), citing Nordenskiöld and Tessmann respectively, shows that the real slit drum reappears in early America, where it is restricted chiefly to the northwestern parts of *South* America, including Peru. According to an illustration reproduced by the author, the Kapanahua type of slit drum found in northwest Peru is very similar to the type still in use in the Tuamotu archipelago; and still more so, although of larger dimensions, are the split drums or signal gongs described and illustrated by Nordenskiöld (1930, p. 45) from Colombia. These resemble a clumsily made model of a dugout canoe.

Since parallel forms to the South American slit drum are found in Oceania, Izikowitz (1935, p. 17) states that "many investigators have believed it to be imported from Melanesia." Both Izikowitz and Nordenskiöld show the unfeasibility of such a claim, since all evolutionary stages of the slit drum—from primitive forms to more complicated types—were found within aboriginal South America. On the other hand we may here, as usual, note that this does not prevent the element under discussion from having spread downwind to Oceania.[1]

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[1] Roberts (1926) also describes a very unusual form of foot-drum placed in a hole in the ground and stamped upon by the drummer. She states that it is known from Easter Island and Hawaii, and is recorded from some North American Indians.

The gourd-rattle

Emory (1942 b, p. 131) writes: "Nordenskiöld omits the gourd-rattle of Hawaii from comparison with the gourd-rattle of coastal Peru and Colombia, because a German musicologist, Curt Sachs, regarded the Hawaiian rattle as post-European, which it is not. Captain Cook, the discoverer of Hawaii, collected and described them." Emory (*Ibid.*, p. 132) therefore, of his own accord, adds the gourd-rattle to his revised list of Nordenskiöld's South-American-Oceanian culture elements. And indeed, Cook (1784, Vol. II, p. 236) speaks only of drums and gourd-rattles in recording the musical or sound instruments he saw in early Hawaii.

As to the homeland of the gourd-rattle, we find in Izikowitz's monograph (1935, p. 122): "Most likely we must look to Central America for the land of the origin of the gourd-rattle..." He finds that the idea probably began with the *Crescentia* rattle, as this specific Central American fruit rattles when ripe. Later, when transferred to the gourd, the custom spread to South America, where gourd rattles are excavated from graves in prehistoric Peru.

Clothing

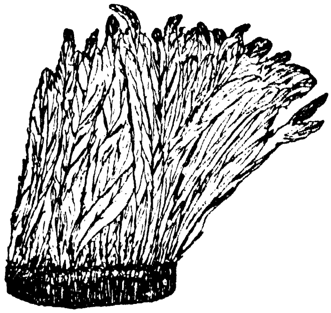
Feather cloaks and feather headdresses

Buck (1926 b, p. 145) points out that featherwork has a universal distribution throughout Polynesia. He quotes Stokes, who stated that it existed "on every island where there were Polynesians and birds." This is very remarkable, since featherwork of any form is conspicuous by its absence throughout Indonesia and nearly all the Old World. It is, on the other hand, another most typical element among the majority of the American high-cultures, and it is in fact one of the specific elements that contrast the New World civilizations from those of the Old. Nordenskiöld (1930, pp. 8, 19) lists feather ornaments among the principal cultural elements possessed by the American Indians which were unknown among the Old World cultures prior to Columbus. This, as we have just seen, is not correct unless we specifically include, as part of the "New World", the subsequently discovered island territory of *Polynesia.*

Wissler (1917, p. 61) also shows that featherwork is "one of the most characteristic developments of New World technique..." He points to a probable centre of this unusual art in Mexico, and shows from there a distribution northwards to California and southwards to ancient Peru. He states (*Ibid.*): "Cloaks and mantles for distinguished persons, headdresses for war leaders, and other badges of distinction were in feather mosaics... We may also be reminded of the very striking parallel in Hawaii and the possibility of an historical connection between the two."

In his three publications on the "Hawaiian Feather Work", Brigham (1899; 1903 a; 1918) shows the elaborate form of this ancient local art, and states (1899, p. 4): "When Cook anchored off Waimea, Kauai, in 1778, on his first discovery of the Hawaiian Group, he and his officers at once noticed the feather robes and helmets, ..."

From the very early years of European settling in Polynesia, observers began to see the analogies between the elaborate feather cloaks and feather head-dresses of the high chiefs



Feather head-dress from Easter Island.
(From Métraux 1940.)

in Polynesia and America. Ellis (1829, Vol. IV, p. 433) lists the characteristic feature of the feather head-dresses of the chiefs as one of the series of correspondences that "have been shewn between the aborigines of America and the natives of the eastern islands of the Pacific, ..." and Roberts (1926, p. 341) states in modern times that the feather headdresses as worn by certain American tribes and by the natives of Polynesia, e. g. Easter Island, "are so alike that they might almost be mistaken, one for the other." A critical observer as well as defender of the independent culture evolution in America such as Boas (1925, p. 28), writes: "I do not deny that there are indications that may point to the introduction [to America] of certain details from Polynesia, such as the use of the pandean pipe and certain types of feather ornaments; some of the details described by Dr. Koppers and M. Gusinde remind us strongly of Polynesia." Handy (1930 c, p. 24) also emphasizes that certain Polynesian traits, such as the "ceremonial and ornamental use of feathers, ... find their parallels in America rather than west of Polynesia."

In America, indeed, they are found on the coast that lies nearest to Polynesia, separated from the Easter Island and Marquesas specimens only by a direct and natural voyage. As Joyce (1912, p. 128) says of Peru: "Feathers were applied to cloth to form mosaic designs, and head-dresses of this work, crowned with plumes, form some of the handsomest objects yielded by the graves in the coast valleys." A truly gorgeous and colourful feather cloak from the coast near Lima is reproduced by Schmidt (1929, Pl. 17).

The most outstanding Polynesian feather capes or cloaks come from Hawaii, and specimens from this group, treasured by the early voyagers for their beautiful finishing and brilliant colours, have found their way to leading museums in many parts of the world. They are real art treasures even by modern standards, and display a delicate and minute workmanship that represents an enormous amount of labour. The mere collecting of the vast quantity of feathers which entered into the making of the royal cloak was a truly colossal undertaking, as the small birds required often had only very few feathers of that particular red or yellow colour needed for the pattern.

Beside the Hawaiian specimens, Brigham (1899, plate II) illustrates a beautiful feather cape from Tahiti, where feathers and feather garments were also greatly esteemed, although the local feather-work never assumed the dimensions of the long Hawaiian cloaks. Henry (1928, p. 285) writes about Tahitian kings and other men of high rank: "Their *tiputa* [*poncho*] were of red, black, and yellow feathers, or of white tapa, plain or fringed, bordered with '*ura*' feathers..." In New Zealand too we find elaborate feathercloaks among the chiefs. Banks (1896, p. 234), for instance, describes a Maori "who had an entire dress of the red feathers of parrots; but these were not common." Beechey (1831, p. 35) also wrote from Easter Island: "About this time, one of the natives, probably a chief, with a cloak and head-dress of feathers, was observed from the ship hastening from the huts to the landing-place, attended by several persons with short clubs."

Since the base to which the feathers were attached varied in the respective parts of

Polynesia (e. g. coherent tapa in Hawaii and finger-woven flax in New Zealand), the technique of attaching the feathers varied also. Thus Buck (1930, p. 668) writes: "Samoan feather-work though not extensive was important as the valuable fine mats were not complete without it. The feathers were not woven into the edges of the fine mats as Linton states. They were caught in the knots of a fine thread as already shown and the thread bearing the feathers was sewn along the edge of the mat by another thread. The feather kilts and one form of addition to the *tuinga* headdress consisted of strings of feathers knotted in the same way. The technique of knotting feathers to a thread was described by Ling Roth in some warps of an old Maori cloak but it seems to have been an abnormal instance. The technique of feather work in eastern Polynesia consists of no less than three methods, all of which are listed by Linton. In Hawaii and the Society Islands, the feathers were tied by a separate thread to the meshes of the network which formed the basis of the cloak or girdle. In the Marquesas, the feathers were pasted to the material they had to decorate. In New Zealand, the feathers were fixed to the warps by the weft elements as the weaving of the garment proceeded. There is nothing common in the technique of the four methods of the Polynesian area enumerated but each method of feather fixation has been influenced by the form of the base they had to decorate."[1]

We cannot, of course, deduce that the idea of feather-work as chiefly and royal garment was independently and spontaneously invented on all the major Polynesian islands just because the natives in some of the islands preferred to attach the feathers to a thread before they knotted this thread to the cloth (Samoa and occasionally New Zealand), whereas others introduced the feathers while actually finger-weaving the cloth (New Zealand), others again knotted the feathers individually to a ready foundation (Hawaii, Society Islands), and some even pasted the feathers on to the ready prepared base (the Marquesas Islands). Indeed, we can distinguish, say, Marquesan featherwork from that of neighbouring Tahiti by such a discriminating study of the technique involved, but we must not so blind ourselves by specialization that we can no longer grasp the broad uniting links. We therefore do not agree with Emory (1942 b, p. 132) on this particular point when he comments on Nordenskiöld's list of Oceanian-American parallels: "He also does not, as has often been done, compare Peruvian feather cloaks with the Hawaiian and New Zealand. We do not consider that the Hawaiian and New Zealand cloaks have a common origin, so different are they in shape and technique. For the same reason, the Peruvian cloak is likely to be an entirely independent creation."

This argument is not very strong, for feather-cloaks may certainly be related even where different methods are employed for the purpose of acquiring them. Thus Morley (1946, p. 438) writes from ancient America: "Father Sahagun, our greatest authority on the Aztec, tells us that they had two kinds of featherwork: '...the first kind of work consists of fastening the feathers to the background with paste in order thus to finish the work; the second way consists in doing the work and finishing it with the help of thread and cord.' "

The caption to a large Hawaiian feather cape exhibited in the American Museum of Natural History, New York, reads as follows: "The Hawaiians, unlike the Pomo Indians of California, did not introduce the feathers during the process of weaving the foundation, but like the Peruvians knotted them to a foundation. They differed, however, from the

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[1] See also Buck (1924, p. 304) for method of manufacture of feather cloaks in New Zealand.

Peruvians in attaching the feathers separatedly to the netted base, while the South American craftsmen fastened the feathers to a cord and then knotted the cord to the cloth."

With other words, on the specific detail where the Peruvian working method differed from that of Hawaii, it happened to concur with that of Samoa (and occasionally New Zealand), and although the Peruvian working method was more like that of the Hawaiians than that of the American Pomo Indians, yet also the latter was duplicated in New Zealand. And the easiest way out, simply to paste the feathers directly to the base, as done in the Marquesas group, was one of the two methods resorted to in aboriginal Mexico, while the other Mexican method was the aforesaid Polynesian technique of attaching the feathers to a ready base by means of a thread. It is therefore impossible to speak of any of these methods as exclusively Polynesian, they are all mere repetitions of the basic techniques of feather-work found among the natives of aboriginal America.

To discriminate between tribes and sub-groups we must focus all attention on the details, but to see the basic interrelationship we must step back and take a fuller view, perceiving also in this case the close American-Polynesian concurrence and the contrast to all of Asia.

The poncho

We have seen (Part II) that the present Maori-Polynesian tribes follow the Northwest Coast Indian custom of wearing little or no clothing, wrapping themselves in bark-blankets particularly in cold weather and on ceremonial occasions. The finger-woven blankets worn by the New Zealand Maori and the Northwest American Kwakiutl concurred to a very remarkable degree. Yet in Tahiti a completely different type of garment was in use, which, from its strangely isolated occurrence in the midst of the blanket-wearing Polynesians of surrounding groups, has caused much comment and discussion. We do not have to go very far to find the nearest territory outside Polynesia where a similar garment was both characteristic and widely used. In his handbook on Polynesian clothing, Ball (1929, p. 39) writes from Tahiti: "The characteristic outer garment of the men was the *tiputa*, which resembled the poncho worn by the natives of Peru and Chile. This was prepared by cutting a hole in the center of an oblong piece of tapa, through which the head was trust, the ends extending downward to the knees in front and behind. Over this another wide band was wound about the body. Streamers of tapa were sometimes added as ornaments."

In Ellis' early day observers were already aware of this analogy. He wrote (1829, Vol. IV, p. 433): "Various points of resemblance have been shewn between the aborigines of America and the natives of the eastern islands of the Pacific, in their modes of war, instruments, gymnastic games, rafts or canoes, treatment of their children, dressing their hair, feather head-dresses of the chiefs, girdles, and particularly the *tiputa* of the latter, which, in shape and use, exactly resembles the *poncho* of the Peruvians."[1]

In the journal of Banks' early visit to Tahiti in 1769 we also read (1896, p. 149) of "the *tebuta*, a garment used equally by both sexes instead of a coat or gown, which exactly resembles that worn by the inhabitants of Peru and Chili, and is called by the Spaniards *poncho*."[1]

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[1] And in another passage (*Ibid.*, Vol. I, p. 178): "The *tiputa* of the Tahitians co rresponds exactly to the poncho of the South Americans. It is rather longer, but is worn in the same manner, having a hole cut in the centre, through which, when worn, the head is passed; while the garment hangs down over the shoulders, breast and back, usually reaching, both before and behind, as low as the knees."

Byron (1826, p. 207) writes of one of the natives who came aboard his ship in the Hervey Group, that, "...besides his maro or waist-cloth, he wore a cloak of tapa, of the same form with the South American poncho."

The similarity of these Polynesian and Peruvian garments was apparently too conspicuous to be ignored, and as no one could claim with success that a major part of the Andean culture-people had learnt their traditional manner of dressing from the islanders at Tahiti, other explanations have been attempted. As Ihle (1939) shows, many theories have been advanced to make the Polynesian type of poncho a *European* introduction from Peru into Tahiti. In his paper on this problem Ihle goes to a great length to disprove these meaningless suggestions, which have merely been launched to account for the surprising occurrence of an analogy where no relationship was expected to exist. However, having clearly and emphatically proved that the poncho existed in Tahiti in pre-European times, Ihle concludes that it must *a priori* be a true Polynesian culture element, and that its origin must accordingly be sought in Asia and not in Peru. He thus proceeds to argue that the pre-European poncho in Tahiti must have come from Farther India, where he proposes that the origin could possibly be seen in the local "sleeveless coats," and he suggests as stepping-stones some poncho-like costumes worn by certain hill-tribes of the Indonesian interior and at Truk in the Carolines. His arguments for bringing the poncho to Tahiti from the west are certainly not very convincing, especially since no reason is given as to why we should ignore nearby Peru, the principal and most characteristic habitat of all real poncho-wearing peoples. Ihle's obvious success in proving that the Tahitians dressed in poncho before any *Europeans* could have brought them the idea from the natives of Peru, does not infer that the natives of Peru could not have brought the poncho themselves, in the earlier period when they planted the Peruvian cotton in Tahiti, a plant used in Peru principally for making ponchos. (See part VII.)

As the case stands, we are inclined to agree with Emory (1942 b, p. 132), who considers the Tahitian *tiputa* a culture parallel to the New World poncho. He says: "Nordenskiöld omits comparing the Peruvian poncho with the Tahitian, which differs mainly in the material and the unsewed sides." To correct this omission on Nordenskiöld's part, Emory (*Ibid.*) adds the poncho to the series of Peruvian elements shared with Polynesia.

We have also seen in Part II how the newly arrived Maori-Polynesian blanket people spread their loomless culture and bark mallet through all their conquered territories. The loom, while absent from Polynesia, appears sporadically in Melanesia and Micronesia. Many observers, like Nordenskiöld (1931, p. 19), have suggested that *Melanesians* brought the so-called "Arawak loom" to parts of South America and Mexico. On the other hand, Brown (1927, p. 94) writes from Micronesia:

"The native loom, differentiated from the Malay by greater simplicity, and separated from its influence by a gap in the Pelews [Palaus] and Yap, which are loomless, passes all through the Carolines, and finds its way sporadically into Melanesia and the north coast of New Guinea. Is there an American element? It is true it has a strong resemblance to the loom of Mexico, Central America, and Peru on which the serape and poncho are woven. And one of the striking things about Carolinian culture is that in the Ruk archipelago the people have worn a poncho from time immemorial; it is sometimes a mere shoulder-cape or tippet; but as frequently it is a square blanket hanging at the corners to the knees; but both have the oblong hole to thrust the head through. There is a wide gap between Ruk and Tahiti, where the tiputa took also the poncho form, and a still greater gap between Ruk and America, central and Peruvian, where the poncho or serape, a square blanket with an oblong hole in it for the head, is still the *sine qua non* of native dress. It is difficult to see how these gaps could have been bridged without leaving traces of the poncho on the stepping-stones between. Yet drift canoes may have carried it one way or the other."[1]

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[1] And in another passage (*Ibid.*, p. 186): "The richer had garments... most beautifully made, and exactly like that of the South American Indians at this day, ..."

Before we leave this additional discussion of the last basic element in Polynesian clothing, let us add that the knowledge of bark cloth manufacture as such may not have been entirely alien to the Polynesians even in the early island era. It has been suggested that this custom reached northwestern America by the northern route with the original migration of Yellow-brown man. We have seen that bark cloth manufacture was known in Peru also until cotton cultivation made this earlier local custom out of date. Bird (Whitaker and Bird 1949, p. 3) writes of the presence of vegetable remains in the earlier levels of his shell midden on the North Peruvian coast: "Two other plants, as yet unidentified, were of considerable economic importance: one provided bark for bark cloth, and the second, possibly *Agave*, yielded a bast fiber used to some extent in combination with cotton in the production of many fabrics. In this period there was no evidence for the presence of maize." Although the manufacture of bark cloth gradually went out of use among the main civilizations of Inca Peru, bark cloth and bark cloth mallets survived sporadically as culture elements from Mexico and Central America to Colombia, the Amazon region and Bolivia right into historic times. (Nordenskiöld 1931, pp. 19, 21.)[2]

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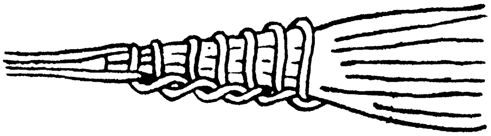
[1] The fact that Polynesia would be the natural oversea reception area from Peru—whereas Micronesia and in part even Indonesia would be that from Southern Mexico—has been pointed out in Part VI. A South American inspiration behind the *tiputa* of Tahiti would be the only logical explanation, apart from independent invention. The case for independent invention in Peru and Polynesia would have been much stronger had the *tiputa* stood alone as an argument for a local diffusion, which it does not. The poncho-like costumes of Ruk [i. e. Truk] and a couple of the Indonesian hilltribes did not inspire Polynesia and can hardly have been inspired from there, and if the future should ever bring reasons for connecting them with early American ponchos, we should look to Mexico rather than to Peru. This was stated in Part VI with regard to the Mexican-like stone carvings in South Sumatra, of which Hoop (1932, pp. 70, 71) wrote with reference to the human figures depicted: "The upper part of the body is sometimes covered with the article of clothing which in South America is called a 'poncho' and which consists simply of a long rectangular piece of cloth with a hole in it, through which the head is pushed. This clothing we find only in the case of human figures which sit in a squatting attitude with knees drawn up. The image Pageralam is so clothed and carries a child on its back. Further, the poncho is never combined with a sword, and is thus perhaps an article of dress for women. ... In old pictorial representations, of Aztec origin, we find women wearing an article of clothing which resembles the poncho. In South America, the poncho of the Chaco Indians (Tschiriguano, Tschané), is well known. P. Schmidt considers the poncho in South America as one of the Polynesian culture elements."

[2] Lévi-Strauss (1950, p. 475) writes of South American *bark cloth:* "Bark cloth may be obtained from several species of trees. In eastern Bolivia and on the upper Amazon the Indians use bark of trees of the genus *Ficus*, which are known in Bolivia as bibosi. From the Guaporé to the Orinoco River cloth is made from the bark of species of *Bertholletia* and *Cariniana*; in the northern parts of the continent and in the West Indies, from cabuya (*Fucraea gigantea*), majagua (*Hibiscus tiliaceus*), memiso (*Muntingia calabura*), and man-barakrak (*Lecythis ollaria*); and in eastern Brazil, the bark of embiriti (*Bombax munguba*).

If tapa in some form was known in Polynesia already in the first local era, which is highly probable, then it is even possible to suspect a South American inspiration behind the custom found in some Polynesian islands of ornamenting the bark cloth with regularly printed designs, applied by means of carved wooden stamps dipped in dye. For, in his paper on bark cloth manufacture among the South American Indians, Métraux (in Steward 1949, p. 68) writes: "In many tribes (*Yuracare*, *Mojo*, and *Moré*) bark-cloth fabrics are decorated with painted ornaments applied by means of wooden stamps." Linné (1929, p. 49) shows that the American distribution of cylindrical stamps for printed motives are limited to the intertropical high-culture area. Colour stamps are also found archæologically in the Tiahuanaco area. Some of the stamps from Puna Island preserved in the Museum of Guayaquil are carved to apply as ornament a bird-man motive which resembles most strikingly some of the symbols in the Easter Island script.[1]

Pavahina

We have seen that the Maori had a high regard for their golden-haired dog, the *kuri*, and that fringes of dog's hair were occassionally worn for ornamental purpose. In his paper on "The Evolution of Maori Clothing", Buck (1926 b, p. 249) illustrates the peculiar Maori badge of dog's hair which is reproduced here. He writes: "The tassels of dog's hair much resemble the ornament called *pavahina* by the Marquesans. ... This is another of the many affinities between Maori and Marquesan material culture."



The *pavahina* is a highly treasured ornament among royalty and chiefs in the Marquesas group. We have seen (Part VII) that, instead of from dog's hair, it was occasionally made from a tuft of *Aristida subspicata*, a specific South American grass growing in the prairie of Nukuhiva Island, which Brown thought might have been imported by the aboriginal inhabitants "at the same time that the wild pineapple was introduced." But generally the *pavahina* was made of the highly treasured *yellowish-white beard* of old men. This much valued beard was separated into tufts bound at their bases and fastened there to individual braids of coconut-husk. A number of these braids were again united in fan-form, gradually converging to a narrow base terminating in a cord by which the strange badge was fastened to the head-dress above the eyes.

This peculiar ornament seems somewhat analogous to a similar badge formerly worn in Samoa, of which Turner (1861, p. 329) writes: "A tuft of human hair dyed light brown is added to the top of their fancy head-dress, or helmets, on gala days, and when reviewing the troops the day before battle."

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[1] The iconographic art of the prehistoric Early Chimu culture shows among the headwear of chiefs, warriors, and deities a variety of peculiar crested helmets which differ from those known to have been worn anywhere in South America in Inca time. This headgear often appears in a shape strongly reminiscent of the peculiar plaited and crested helmets of Hawaii, which Gladwin (1947, p. 270) compared with "Greek helmets of the days of Alexander." Indirectly he admitted that it was unnecessary to go that far afield for comparisons, since he also (*Ibid.*) mentioned that such or similarly crested helmets were drawn on the ancient Peruvian heroes depicted in the Early Chimu art. (See e.g. fig. page 572.)

But we have to go to South America to find the closest analogy to the Marquesan *pavahina*, an analogy which is even more striking than the Maori one pointed out by Buck. Montell (1929), in his monograph on *Dress and Ornaments in Ancient Peru*, illustrates a "Feather ornament probably worn in the head-dress", which was discovered archæologically in a prehistoric desert grave at Ica on the Pacific coast of Peru. Its strong conformity with the *pavahina* of the Marquesas islands is apparent from a comparison between Plate LXXXIII **1** and **2**.

The Ica specimen is prehistoric, but in view of the above comparison we may well see a further analogy in the important tuft which formed the royal badge even of the historic Inca. Markham (1911, p. 121) writes of these Andean monarchs: "...and round the head was the sign of sovereignty. The *llautu* appears to have been a short piece of red fringe on the forehead, fastened round the head by two bands." Cieca de Leon (1553—60, Bk. 2, Chap. 7) wrote of the Inca coronation: "When this was done and he had procured the invocation in the Curicancha temple [Temple of the Sun], he received the tuft which was great and hang down from the *llautu* with which his head was covered, falling down to above the eyes; he was then considered as sovereign, and was greated as such."

Whatever the symbolism behind this peculiar badge, the specimen from prehistoric Ica, and the conventional form down-wind in the Marquesas group, are too specialized (in construction and purpose) and too close (geographically and morphologically) to seem the result of parallel evolution or pure chance.

Ornamental patterns

Many attempts have been made to list casual similarities in ornamental patterns in and around the Pacific basin, and many ill-founded theories of cultural contact have been based solely on the observation of analogies of an unspecialized nature that have no value without concurring with more conclusive evidence. The only sound attitude in the study of art motives and designs seem to be that represented by Schuster (1951 and MS), who has accumulated a vast material on ornamental patterns from the Pacific and circum-Pacific regions in the course of his unbiassed research into artistic traditions. Demonstrating the wide use of "joint-marks" on the Pacific islands as well as in North and South America, Indonesia, China and the shores of the Bering Straits, he simply comments (1951, p. 3): "Because of the rapid progress being made toward the determination of historical factors in human culture by means of new techniques developed in the natural sciences (such as the use of radioactive carbon to determine the ages of certain materials, and blood-analysis to determine the consanguinity of racial groups), it is by no means unthinkable that similarities between cultures of widely separated peoples which we now observe, but cannot yet explain, may eventually find their proper place in an historical framework. Against the day when it may become possible to coordinate our observations of cultural phenomena with the findings of physical science for the reconstruction of unwritten history, it seems to us important that whatever evidence can be found for cultural and especially artistic correspondences between the Old and New Worlds should be gathered and sifted."

We have already seen that the eye-motive in ornamental art, various petroglyphic motives, certain Easter Island signs, and a number of other artistic traditions in Polynesia find their counterpart, often to a conspicuous degree, in Pacific South America, or on the Northwest Coast. Other Polynesian design motives which are shared also with East Asia and Indonesia, such as the jointmarks or the V-shaped chest-markings pointed out by Schuster, are shared to the very same extent by the North and South American Indians too, and combined with other evidence they may serve as a guide to circum-Pacific migrations and relationships, but not as a special pointer as to the final sailing-route to Polynesia.

The most conspicuous and probably most discussed design motive in Polynesia is the single and double or interlocked Maori spiral, which is of such outstanding local importance in spite of the fact that the dominant decorative art in Polynesia proper is rectilinear.[1] The Maori spiral was therefore suggested by some to be an inspiration from Melanesia, but Archey (1937) states: "Recently it has been shown... that the curvilinear habit in Maori carving is a local development fundamentally different from the Melanesian art." It is obviously possible that the Maori developed the spiral and its whole traditional importance of their own accord after settling New Zealand. Yet the almost religious significance of the pattern may indicate veneration for a symbol inherited from the earlier island colonists. Skinner (1924), in his paper on "The Origin and Relationships of Maori Material Culture and Decorative Arts", does at least consider the Maori spiral of sufficient importance to serve as a guide to Polynesian migrations. He says (*Ibid.*, p. 242) of the Maori spirals that they may be "traced back through the Malay archipelago, India, Persia, and the eastern Mediterranean to Egypt."

The danger of thus tracing extensive prehistoric sailing-routes on the basis of the world distribution of a rather simple design motive is obvious, at least if the attention, as so common in Polynesian research, is biassed in one direction only. For Nordenskiöld (1930, p. 157) writes from South America: "That ornamentation may have been very conservatively preserved is apparent from the study of Chiriguano and Chane ceramics. ... They also possess the double spiral that in South America was characteristic of the pre-Columbian culture throughout northern Argentina, northern Chile and southern Peru. These ornaments must have been copied from generation to generation for more than 400 years [of Inca rule] without any change. Besides, the spiral is of general occurrence in large tracts of South America..." Posnansky (1913, Figs. 5, 36, 37) shows that the double-, single-, and even the rectilinear spiral were all used in ancient Tiahuanaco. Phillipps writes in a letter to the author:[2] "For a long time I have been of the opinion that in the past there was a considerable trade between South America and the islands of the Pacific. Latterly, I have been studying Maori designs, in particular the Maori spiral types, and have just completed a paper classifying these types. In many cases they are surprisingly like types found in old South American work; in fact, a number of other designs from as far south as Santiago appear in Maori carving workmanship; ..."

More recently Fussler has pointed out to me[3] that the designs on some of the Hawaiian tapa cloth and old Peruvian textiles were so much alike that he was inclined to suspect a prehistoric diffusion from the South American continent to the East Pacific islands.

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[1] Enock (1912, p. 245) reproduces some Marquesan designs together with some from Peru and Mexico, and it is not easy to distinguish the Polynesian element from the American. He writes: "Upon the ornamentation of the work of these people of the Marquesas, as shown on their carved coconut and rosewood dishes, is the 'Greek' pattern, which is reproduced here, such as is so marked a feature of the ruins of Mitla in Mexico, and of ornamentation and sculpture in prehistoric stone and textile fabric in both Mexico and Peru..."

[2] W. J. Phillipps, Dominion Museum, Wellington N. Z., letter to the author dated July 31, 1947.

[3] K. H. Fussler, The University of North Carolina, letter to the author dated July 28, 1951.

Knotless netting

In a paper on "Knotless Netting in America and Oceania", Davidson (1935, p. 117) remarks that previous investigators have "pointed out many resemblances and several striking similarities between certain culture traits of the New World and Oceania." Like so very many others he refers to the logical objections to any hasty conclusion that island tribes inspired the peoples of the American continent, and then he adds: "In spite of these objections, many of which are formidable, it is to be admitted that many of the resemblances are indeed puzzling, and the chance that some traits may have been carried across the Pacific purposely or inadvertently must be recognized." Then he writes: "There is one trait which generally has not appeared in the lists of resemblances between the New World and Oceania and that is knotless netting." The local antiquity of this art in South America appears from the following statement by the author: "It seems to be prominent along the west coast of South America as well as east of the cordillere and is found archæologically in pre-Incan graves at Arica. In addition, it is important to note that not only is knotless netting applied primarily to the construction of soft pliable carrying bags in Oceania and the Americas, but also that in the two regions the techniques employed are identical in some cases and very similar in others. On the basis of all factors, ethnological, archæological, geographical and technological, it would seem that knotless netting lends itself much better to a discussion on the possibility of trans-Pacific influence in American cultures than do many of the traits usually given as examples of such a movement."

It is interesting to note that even this special subject seems to argue a trans-Pacific relationship between America and Oceania, with pre-Inca graves as a possible Pacific South American link. There is nothing in Davidson's material that loses in importance when we consider the two remaining factors not mentioned by him, namely chronology and aboriginal navigation. It would only appear then that the inspiration may have gone the natural way down from Peru rather than vice versa.

Rounded house-ends

We found in Part II that the Maori of New Zealand followed the architectonic and ornamented pattern of the Northwest Coast Indians in all essential features of their house construction. On several of the intertropical islands the climatic conditions necessitated a change in the traditional form of dwelling, and only the rectangular ground plan with gabled roof and occasionally carved wooden house posts survived in these interlying geographical territories. However, as Burrows (1938) shows in his study of cultural differentiations in Polynesia, there are certain exceptions to the local distribution of the rectangular house-form. This is exemplified (*Ibid.*, p. 31) in a peculiar oval house-form which was "a special type formerly built on Easter Island." Amasa Delano (quoted by Churchill 1912) wrote of this house-type: "We saw a large kind of house near the shore that must have been two hundred feet long; and also many more of different forms. The most common form we saw was like a haycock. Some appeared to be built with stone, and others thatched over."

This haycock-shaped Easter Island house is in contrast to the carved Maori plank-house, and suggests inspiration from an area where the building material for dwellings had been stone, turf, or grass, rather than wood. An oval house-form has survived in the architecture of Samoa and neighbouring islands. Burrows (1938, p. 31) writes thus of the Polynesian house: "Rounded ends are recorded from all the westernmost islands. In the Tokelaus they are not found now; but a 'god-house' with rounded ends is described and illustrated in the report of the U.S. expedition of 1838–42. This record is supported by a statement of one of Macgregor's informants that the ancient god-houses had rounded ends."

Oval houses of the haycock shape were built in several parts of tropical America, and also occur occasionally among the rectangular Inca houses in the Andes. (Rowe 1946, p. 222.) Some of the old ceremonial buildings of Peru appear to have had rounded ends. (*Ibid.*) The Uru who inhabit the region of Lake Titicaca, and who claim to be the oldest race in the world, antedating even the local appearance of the sun, build most of their thatched houses with an oval ground plan. (La Barre 1946, p. 578.) Bennett (1949, p. 131) found both round and square house foundations in the archæological sites from the early cultist period on the north coast of Peru. And Krämer (1906), who after previous travels in Polynesia inspected the houses of the Araucanians of the Chilian Andes to the south of the Uru tribes, wrote: "The houses were built in oval form like those of the Samoans, and as a whole the entire construction was very similar to the 'great house' or *faletele* in Samoa. The only difference was the complete covering of the sides of the house except for the beam-framed entrance on one of the rounded ends, and the tent-like arching of these rounded ends by means of perpendicular bars instead of horizontal purlins. But the round arching roof resting upon posts in the middle, together with the mutual termination of the house by rounded ends and the concurring use of side-posts, somewhat surprised me at first."[1]

It may not be impossible that the oval house of Samoa, reappearing in a somewhat similar shape also in Easter Island, comes from a prototype similar to the Araucanian house, and that this house type was more prevalent in the two respective geographical areas at the time of the first peopling of Polynesia. Certainly, none of the peculiar and characteristic house-forms of Indonesia, as met with in Sumatra, Java, etc., have found their way to Polynesia. In historic times the two Polynesian forms, as best represented in the Maori and the Samoan house-types, find their closest counterparts respectively among the Northwest Coast Indians and the Araucanians of the Southern Andes.[2]

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[1] For further description of the Araucanian house, termed *ruka* or *tabú*, see Cooper (1946, p. 706).

[2] The houses were without any real form of furniture either in historic Peru and Polynesia. Rowe (1946, p. 224) writes from Inca Peru: "The only kind of chair (*tiyana*, 'seat') was restricted to high officials to whom the privilege had been granted by the Emperor. Cobo describes it as a low seat, about two palms long and one palm high, with a slightly concave top. It was carved out of a single piece of wood, in the shape of an animal with short legs, lowered head, and raised tail." Linton (1926, p. 80) writes from Polynesia: "The natives commonly sat on the floor, but the Society Islanders and Tongans had four-legged stools hewn from single blocks of wood. These were used only by chiefs and heads of families." Emory (1947, p. 39) shows that the ceremonial wooden stool with legs also was in use in the Tuamotus, and Buck (1932 a, p. 82) mentions four-legged wooden seats from Rakanga in north-central Polynesia. Nordenskiöld (1931, p. 17) lists the wooden seat from wide areas of Mexico and South America as well

Mirrors

We have seen (p. 200) that there is a peculiar legend in the Tonga Group to the effect that the industrious fair element in the earliest island era, alluded to as the "steersman-of-the-log-craft," was skilled in the making of *looking-glasses*, an art which was lost when this white race was slain and driven away by Tangaroa's black son. As we know, glass was not known to the early Polynesians, and the strange remark in the old Tongan legend could easily have been passed by if archæology, at least on some of the other Polynesian islands, had not actually proved that ingenious mirrors were actually manufactured in prehistoric Polynesia.

Brigham (1908, p. 187) describes smoothly polished and circular stone mirrors, *kilo pohaku*, from ancient Hawaii, referring to them as "one of the most ingenious of savage contrivances." He writes in an earlier publication (1902, pp. 66, 67): "Stone Mirrors.—The *kilo pohaku* of the Hawaiians were most ingenious. ... Whoever may have been the lucky inventor, the results as we have them today are certain well-ground circular disks, less than half an inch thick, and of diameter varying as shown in Fig. 66. [From 2 to 4 inches] ... I know of no other sub-civilized people who have adopted this ingenious conception. Specimens are no longer common. The stone is a sort of basanite, quite as compact as the phonolite used for adzes, and it is of a uniformly dark color in all the examples noted." We learn that the best reflection was obtained when the stone mirror was held in shallow water and the face in the sun. Aboriginal stone mirrors used by Hawaiian medicine men "usually had a small hole drilled near the outer edge for a suspending cord." Bennett (1931, p. 77), in his monograph on the "Archaeology of Kauai", similarly states that all the polished-stone mirrors from that island are circular, generally from 2 to 5 inches in diameter, and made of fine-grained black or dark brown basanite. He states: "Two mirrors have a hole drilled through near one edge, probably for suspension when not used."

One or two quite similar stone discs of polished serpentine, also perforated near one edge, are illustrated by Duff (1950 b, Pl. 14). They are excavated from the earliest (the "Moa-hunter") culture level in New Zealand, and the author suggest they are "pectoral amulets."

Now, circular *metal* mirrors were introduced to China from south Russia in the 7th or 6th century B. C., but these are not the mirrors which found their way to neolithic Polynesia. Bennett (1949, p. 130), however, shows the importance of stone mirrors on the north coast of early pre-Inca Peru. He writes of the first developed cultures to be traced through the shell middens in this area: "Pyrites or jet mirrors are found in all sites."

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as from Polynesia and Melanesia, and he considers it an 'Oceanian' culture element in South America. Apart from the ceremonial one-piece four-legged wooden stool, there was no furniture in the Polynesian house. The aforesaid mats and blankets served as beds, and in Fiji, Tonga, Samoa, the Society Group, and Hawaii pillows were made from pieces of wood or bamboo raised on legs from three to five inches high. (Linton 1926, p. 81.) Describing such raised wooden pillows among the Chocó Indians (neighbours of the Cuna in Panama), Nordenskiöld (1930, p. 152) writes: "Pillows of this type are even mentioned by Oviedo, among the Chorotegs. These head-rests greatly recall similar contrivances in Oceania." He therefore lists the wooden pillow as an "Oceanic" culture element in South and Central America. Similar forms for pillows are, however, known also from China. (Cook 1784, Vol. III, p. 139.)

Ancient mirrors of marcasite mosaic, pyrites, and polished dark stone (generally obsidian) are well known in museum collections from aboriginal Peru. The latter type may either be rectangular or shaped like a circular disc. (See also Mason 1927, p. 203.)

Saville (1910, Pl. 65) illustrates a circular stone mirror dug up on the Pacific coast of Ecuador (Manabi), which is of the very same type as those illustrated by Brigham (1902, Fig. 66) from Hawaii, only slightly larger. He writes of this important archæological specimen: "In fact, we know of no other examples from the coast of Ecuador, with the exception of 3 very small specimens from La Tolita, and one of larger size from La Piedra, near the city of Esmeraldas." The excavated specimen is a highly polished circular disc of jet-black obsidian, about 7 inches in diameter, and being slightly convexed it has an extreme thickness of 1 inch. (*Ibid.*, p. 168.) At one point near the edge there is "a biconical perforation for suspension, which is ½ inch (1.3 cm) from the edge, and only 1/12 of an inch (2 mm) in diameter at the centre." (*Ibid.*, p. 169.) Saville comments on this find (*Ibid.*): "According to Ulloa, who was in Quito about the middle of the 18th century, obsidian mirrors were extensively used by the Caras in that region. He describes and figures a mirror from a Guaca near Quito, which is of the same type as our specimen. He distinguishes between 2 kinds of material of which mirrors were made in this region; namely, *Piedra gallinazo* and *Piedra inga*. *Piedra gallinazo*, or vulturestone, is undoubtedly obsidian. He says that it has a black color, like that of the vulture (hence its name), and is very hard and glassy, like flint. *Piedra inga*, or inca-stone, is soft, not transparent and of a lead-color. Among mirrors which he stated he saw, many were flat, some concave, while others were convex. They have one side even and smooth, like a mirror of crystal, the other side ovalshaped or a little spherical, and not so well polished. In size they were generally from 3 to 4 inches in diameter, although he states he saw one nearly 1½ feet (45.7 cm) in diameter."

In his paper on "Convex and Concave Mirrors in America", Nordenskiöld (1926, p. 109) states that the obsidian mirrors found on the coast of Ecuador might have come from the Andes plateau, as there is no obsidian on the coast. He also points to the already cited fact that Ruiz found highly developed forms of mirrors among the merchandise on board the balsa raft he encountered off this coast, and adds: "It is therefore possible that the mirrors were an article of barter esteemed over a vast area." Further (*Ibid.*): "The discovery of completely identical mirrors in Peru, in Ecuador, and in Mexico seems to me to be of great interest. As Rivet and Verneau have remarked, we have here one of the numerous culture elements which establish a connection between the two leading civilizations of America."

If this be so, it is highly interesting to note that the same type of prehistoric mirror had found its way out to the nearest islands in the adjoining ocean also.[1]

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[1] In late Inca time copper and bronze mirrors were also invented in Peru, but apparently not in Mexico. Lewis (1947, p. 8) observed, however: "Both in Mexico and Peru concave mirrors were found, articles that had not been seen in Europe at the time of the Conquest. In Peru these concave mirrors were employed in a solemn religious rite. Periodically all old fire was extinguished and a new fire was started by priests who, with these mirrors, focused the rays of the setting sun on a wisp of cotton..."

The importance of jade (nephrite) and the Hei Tiki in New Zealand

Writers from early New Zealand all concur in stressing the Maori esteem for greenstone or jade (nephrite), which was worked to a great degree of perfection. The greenstone is a material not found on the other islands in Polynesia proper. Yet, in her monograph *Jade of the Maori*, Ruff (1950) shows that the working of this stone is intimately associated with early Maori-Polynesian traditions and customs from the earliest arrival. She quotes Rutland, who wrote at the end of the last century (*Ibid.*, p. 36): "A knowledge of the greenstone, the superstitions connected with it, the mode of working, and an idea of its value that made them to seek it as we now seek gold, were imported from their former home."

Ruff does not mention any analogies or similar occurrences in Indonesia, but she does point out the importance of jade among the historic tribes of Northwest America and the early New World high-culture peoples, especially in Mexico. She shows (*Ibid.*, p. 50) that the natives of Northwest America followed the same process in the working of their own nephrite as that used by the New Zealand Maori. She adds: "Even the formation of grooves proceeded in the like manner, unfinished specimens from the North American continent being practically identical with Maori material." The difficulty of finding and working the rare nephrite is quite apparent from her descriptions. A single jade adze-blade seems almost to be "the life-work of one man," since the mere rough cutting of the desired piece from which the blade should be later formed required the labour of "three moons," and only then did the actual work towards the finished article begin.

One is tempted to suspect that the esteem for jade and the method of working it reached the Maori with migrants who knew the customs of the Northwest American coast. However, since Duff (1950 b, p. 239), in his discussion on the use of nephrite in early New Zealand, shows that it belonged also to the "Moa-hunter" period, it may not be surprising that Ruff (1950, pp. 52, 60, 61, 63) finds most of her parallels to Maori jade-work located in Mexico, Central and South America. The principal and most characteristic Maori jade ornament, the *Hei-Tiki*, or neck-pendant in the form of a grotesque squatting anthropomorphic figure, seems to be paralleled only among the American high-cultures. Ruff (*Ibid.*, p. 61) states that one Polynesian observer "has found similarity between the *tiki* and certain Mayan representations, not unlike a squatting figure Epstein might have dreamed over; a symbol of male and female. It has also been likened to a Maya frog. Here we might recall a magnificent jade neckpiece in the form of a carved plaque that has come to us from a mysterious Mexican race—the Olmecs. This plaque, pierced at the top with two holes for suspension, also resembles a grotesque human face. Recent excavations in Mexico under a joint expedition of the National Geographic Society and Smithsonian Institution revealed small jade figures remarkable like the Maori *tiki*, but with head erect."[1]

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[1] In connection with the green-stone figures the author also mentions the importance of the larger image of *green stone* which King Naymlap's raft voyagers brought on their coastal migration to North Peru. (See Part VI.) Referring to the theories that the worshippers of this *green stone* god came from Polynesia, she mentions the sweet potato as a "further support of interchange." We think it is more important here to note that the Maori *Hei Tiki* is always reproduced with a stylized hand showing three even fingers. Posnansky (1914, Pl. 52, 53) shows that hands with three fingers and thumb are typical in early Tiahuanaco. Jade is apparently not known at Tiahuanaco, but Bennett (1934, p. 455) shows that many fragments of "green stone" are found among the Tiahuanaco ruins.

Ruff also describes two main forms of jade ear pendants among the Maori. The one was a long, almost needle-shaped drop, more or less rounded in contour and perforated for suspension near the upper end, the other was similar but, in addition, the lower end was sharply hooked. She writes of the latter (*Ibid.*, p. 63): "We are told that this form was not uncommon in other parts of the world, particularly Central America."

Of the elegant and precious Maori jade adzes she writes (*Ibid.*, p. 60): "Adzes of nephrite weighing five and seven pounds are among the heaviest recorded in New Zealand, but a curious parallel exists with a jadeite adze from Mexico weighing sixteen pounds—believed to be one of the finest pieces of Mexican carved jade in existence—and a nephrite adze of Maori manufacture which also tipped the scale at sixteen pounds."

The reel ornament

Quoting Humboldt, who speaks of perforated cylindrical amulets of jade worn by South American tribes in the Rio Negro region, the same author (*Ibid.*, p. 52) recalls the peculiar type of reel ornament so important in early New Zealand and reappearing nowhere else but on a few Polynesian islands and in aboriginal America. She writes from New Zealand: "A type of spool or reel, fashioned in bone or stone, was not uncommon, though its *raison d'être* is as mysterious in New Zealand as it is on the American continent."

Fisher (1936, p. 25) calls attention also to the American equivalents of these traditional Maori ornaments: "It is interesting to note that similar articles are found in the United States of America, particularly in the Ohio region. They are thus described in a work edited by Hodge (1910, p. 625), 'Small prehistoric objects somewhat resembling spools, the object of which is unknown. They are nearly cylindrical, with incurved sides, perforated lengthwise at the centre, and are made in most cases of sandstone, a few specimens being of baked clay, . . .' " Fisher (*Ibid.*, p. 26), concerning Moorehead's illustration of American specimens, comments: "In size, shape and perforation they resemble very closely the 'spools' found in New Zealand, and like the New Zealand specimens, nothing definite is known of their purpose."

In Polynesia these reels are made of stone, bone, ivory, or shell. Archæological specimens both in human bone and shell were found by the present writer in the Marquesas Group. Duff (1950 b, p. 84) shows that in a variety of forms these peculiar artifacts are reported from Hawaii, Tonga, Fiji, Rotuma, and Atiu in the Cook Islands, but more especially in New Zealand, where they are the typical relics of the earliest local settlers, and where some of the archæological specimens were even made of moa bone. A chain of such early New Zealand moa-bone reels was discovered by Duff (*Ibid.*, p. 54) worn as a necklace by an early "Moa-hunter" skeleton excavated at Wairua of the east coast. This seems to demonstrate the purpose of the reel ornament, although the significance of their shape is yet an unsolved problem. According to Duff (*Ibid.*, p. 82), Graham, a noted Maori traditionalist, had learnt from old Maoris that the reel ornaments were conventionalized human vertebrae, but Graham stated: "To check up on that, one must seek the significance of these objects in Tawhiti-nui, whence they originated." Tawhiti-nui is, as we shall see in the following part, the Maori name for the extensive continental fatherland from which the Pacific islands were first discovered and settled.[1]

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[1] For further description of the reel ornament in New Zealand see Andersen (1940).

Stilts

Old Marquesas islanders still refer with pride to the use of ceremonial stilts in some of the dances formerly performed by their ancestors. Beautifully and conventionally carved footpieces from such ceremonial stilts are among the best known art treasures in ancient Marquesan wood-carving. The origin and importance of stilt-walking among the aborigines of this group greatly puzzled the early European visitors, and has caused much comment. Porter (1815, Vol. II, p. 127) ridicules Fluerien's idea that the Marquesan stilts were invented to cross streams, and shows that these natives spend half their time in water and are in the habit of bathing at almost every stream they cross. He believes instead that the stilts were invented for amusement. Marchand (1801) also suggested that the Marquesan stilts were invented to cross flooded ground in the rainy season, but he is again opposed by Lindblom (1927, p. 9), who agrees with Oldman and Langsdorff that the Marquesan stilts were, at any rate primarily, used during certain ceremonies. This is also what the old natives on Fatuhiva told the present writer; and in his study of the Marquesan culture Handy (1923, p. 297) stresses the same point. He adds: "The use of stilts was strictly forbidden to women." And: "Langsdorff gives the following descriptions:

"The best runners on stilts, who perform at the public dancing festivals, are tabooed three days before; ... We were the more astonished at the dexterity shown by them as they run on the dancing-place, which, being paved with smooth stones, must greatly increase the difficulty."

Linton (1923, p. 387) also refers to the fact that the Marquesas islanders were "unusually expert stilt-walkers", and he adds: "In view of the mountainous nature of the country, and the lack of soft or even level ground, it seems impossible that stilts could have been developed locally. They were used in Hawaii, the Society Islands and New Zealand, but do not appear to have been used in Samoa or Tonga. It seems safe, therefore, to consider them as a feature of the marginal, as opposed to the western Polynesian culture." Linton's statement (see also 1926, p. 133) is supplemented by Lindblom (1927, p. 9; 1928, p. 6), who shows with Friederici and Gill respectively that stilts were also used in Mangareva, in Southeast- and the Hervey Islands in Central Polynesia, stating: "...it appears to me that the use of stilts must have been quite widely distributed through Polynesia." Buck (1938a, p. 106; 1938b, p. 183) also mentions stilts and stilt-dancing from Aitutaki in the Hervey group and from Mangareva, and he writes from New Zealand (1926a, p. 201): "Of all ancestral figures carved in the picture galleries of tribal meeting-houses, that of Tama-te-kapua can easily be recognized by reason of his being depicted as standing on stilts." Best (1922 b, p. 255) also speaks of the "carved representation of Tama on stilts", and states: "*Stilt-walking* was a favoured diversion of Maori youths in pre-European days. ... Stilts are occasionally referred to in Maori tradition, ..."

The use of stilts is another American-Oceanian culture parallel, and Nordenskiöld (1931, p. 19) lists it as one of the suggested "Oceanian" elements in the New World. However, the Polynesians can hardly be responsible for the ceremonial use of stilts depicted and described in early Yucatan and Guatemala. Of the three preserved Mayan codices, both Codex Dresden and Codex Troano (Pl. 21) show a Maya deity walking on stilts. Lindblom (1927, p. 29) quotes Landa who shows that the Maya used stilts in ritual dances during the days immediately preceding the *muluc* year. These Mayan stilt-dances were in fact performed to the honour of their earliest immigrant god Itzamna, the "wanderer" whom we have earlier described. Lindblom (*Ibid.*) adds that ceremonial stilt dancing was known to the Quiché of Guatemala too. Here the wanderer and his twin brother (Hunahpu and Xbalanque) had descended into the underworld in order to avenge their parents who had perished there. According to the description of this event in *Popol Vuh* (see Part V above), when they appeared disguised before the rulers of the underworld, the heroes performed certain dances before them, one of which was "the stilt dance."

In historic times stilts have been reported among a few North American tribes by Kulin (1907), and they have also been found in various sections of the Amazon area and the Andes.[1]

Emory (1942 b, p. 132) writes: "Stilts are widespread in Polynesia and Nordenskiöld reports them from Central America and Mexico, the Amazon region, north of Mexico, and the Gran Chaco. A stilt figured from Cavina, Bolivia [by Nordenskiöld], is a one-piece stilt, whereas the Polynesian are two-piece stilts." As this is admittedly a very insignificant detail, Emory (*Ibid.*) allows the stilt to be a teneable culture parallel between aboriginal Oceania and America. We may add that stilts are not always in one piece in the Andes, the simple Araucanian stilts from Chile have the foot-pieces lashed on separately. (Cooper 1946, p. 740.) Nor are the stilts always of two pieces in Polynesia; in early Tahiti one-piece stilts were used. (Lindblom 1927, p. 9, quoting Ellis.) And in New Zealand both forms occurred, as specifically described by Best (1922 b, p. 255).

Agriculture

The digging stick

Buck (1949, p. 246) writes from New Zealand: "It is curious that the Maori carved the foot-rests of their digging implements (*ko*) and attached them to the shafts in much the same technique as the Marquesans used with their stilts."

It is not improbable that stilts were just invented among agriculturists, who made use of the primitive digging stick. Anyone who has attempted to stand on the foot-piece of a digging stick will realize that as soon as one is placed under each foot the stilt is invented. The digging stick with foot-piece was widely spread among the early American agriculturists. Kulin (1907, Fig. 960) actually illustrates digging sticks used as stilts among the Zuñi Indians, observing (*Ibid.*, p. 731): "The Zuñi boys frequently employ a pair of digging sticks, *Tasakwiwai*, to walk on in the manner of stilts."

Henshaw (1887) comments on the digging stick as an agricultural tool among this same tribe: "The Zuñi have hit upon a device similar to that invented by the Chinook. The spade is a natural branch about three feet long, pointed and flattened, and having a projection stump at a convenient distance down, so that the foot can be employed to press it into the earth. A similar improved digging stick has been invented by the New Zealanders and is described as follows: Their only instrument for tillage was 'a long narrow stake sharpened to an edge at one end, with a short piece fastened transversaly at a little distance above it, for the convenience of pressing it down with the foot.' The digging stick was used among the Fijians as an agricultural implement, as described by Williams... It was also employed by the Tahitians, and is described by Wilson ... as 'instrument of hard wood, about five feet long, narrow, with sharp edges and pointed. These they used as spades or hoes'."

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[1] Stilts are in modern times used among young boys in the Philippines and at the mission stations in Celebes, but this spread seems to have been caused through the agency of modern school teachers (Lindblom 1927, p. 7; 1928, p. 6), probably from China or Japan. In the Old World stilts were also used by the hill-tribes of Assam. (See Part VI).

The digging stick with foot-piece is described by Cook (1784, Vol. I, p. 392) at Tonga, and specimens like those in use among the Maori are recorded also from Hawaii where, as in the former area, they were associated with the cultivation of sweet potatoes. (Bryan 1938, p. 11.)

The same form of "foot-plough" was in use among the high-cultures in the Andes. Even in late Inca time the draft animal and true plough was unknown, and the men, as in New Zealand, worked with digging sticks in the fields. Rowe (1946, p. 211) writes of modern Inca agriculture: "The foot-plow consisted of a pole about 6 feet (1.8 m) long with a point of hard wood or bronze, a footrest near the point, and a handle on the upper end, but it probably varied locally in the shape and dimensions."[1]

Irrigation

Tregear (1904, p. 146) writes: "That the Polynesians were well acquainted with irrigation is proven by the works they executed, and remains of which are still in evidence. The water-races in Hawaii, the extensive ditches at Pelorus and the Thames in New Zealand, and the irrigated cultivations of Tahiti, Rarotonga, Samoa, etc., show that they perfectly understood the methods of leading water for growing crops." And Linton (1925, p. 101) writes from the Marquesas: "Where a better supply of water was available the natives built some extensive terrace systems. A large system of this sort was seen by Handy on Uapou, and smaller systems were examined by me in Hivaoa and Uahuka. The Uahuka terraces are still in use. Their age was not ascertained. A large terrace system in Puamao, Hivaoa, said to be ancient by the natives, is also still in use. It is fan-shaped; the uppermost terrace built across the bed of a small stream, damming its waters, and below this the other terraces spreading out on both sides, filling the bottom of the small valley and extending along its sides." Vestiges of prehistoric terrace cultivation are also visible up to the very summit of some of the barren hills on Easter Island.[2]

It is very unlikely that terrace cultivation and irrigation were independently devised on the Polynesian groups, particularly as some of them are by no means in any desperate need of such arrangements. If we want to suggest that the custom was brought by Polynesian migrants up-wind from those parts of Indonesia where terrace cultivation was in use, we shall have to explain how the custom could pass through the flat atoll barriers of Micronesia, and why no memories of draught animals used in agriculture had survived in Polynesian art and traditions. If we turn to Peru we find irrigation and terrace cultivation an ancient art which, since early pre-Inca times, was practised in barren hills and valleys from the Andes plateau right down to the Pacific lowlands.

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[1] In his thesis on early Maori settlements Bachmann (1931) mentions the Maori custom of placing the agricultural fields away from the settlements and considering planting and cultivation a masculine occupation, and he points to Central America for a comparison.

[2] See also Ongley (1931, pp. 282, 283).

With some hesitation Nordenskiöld (1931, pp. 17, 31) lists irrigation as an "Oceanian" culture element in America, although at the same time he admits that: "Irrigation is a natural adjustment to the surroundings in which the immigrating agriculturists found themselves on the Peruvian coast and in south-western North America." Jenness (1932), on the other hand, emphasizes the improbability of this ancient American culture trait having been introduced from Oceania, pointing to the great importance of terrace cultivation over vast areas from Arizona to Peru. It seems quite evident, for geographical and navigational reasons that irrigation in America and Indonesia was either independently developed or else was inspired down-wind. The sporadic vestiges of aqueducts, irrigation, and terrace cultivation which are found in Polynesia can at least quite naturally be attributed to voyagers from early Peru.

In the atolls, such as in Raroia Island, on which the Kon-Tiki expedition landed, there is nothing to irrigate, but the islanders did still artificially reshape some of their planting grounds, and here also they follow the methods resorted to in ancient Peru. Friederici (1929, p. 467) writes: "In the coastal areas of Peru, such as the Chilca Valley and near Villacuri, garden-plots of great extent had been established, being dug into the ground in the midst of the desert-like sand-plains, so that they strongly remind one of similar constructions on Polynesian islands, where I personally have seen them on the atolls of Nukumanu and Tauu. These are the 'Hoyas de Villacuri' and 'Hoyas de Chilca', which utilize the ground water and shelter the sunken plantations from the immediate action of the wind and desert sand. On the Polynesian islands, pits about 2 m (6 feet) deep and 100 to 500 m² in extent, are worked into the coral rock, and after a layer of humus has been filled in they are turned into gardens in which taro is cultivated." Skottsberg (1920, p. 13, fig. 2 b) reproduces a sketch of a similar sunken plantation at Easter Island, and from these first plantations off South America, the custom might have spread westwards.

Warfare and weapons

A few additional remarks may be in place regarding the Polynesian methods of making war. We have in Part II seen how the Maori-Polynesians in general follow the Northwest Coast Indians in their means and modes of fighting, which was particularly noticeable among the Maoris of New Zealand. The bow and arrow, the short swords, and related fighting weapons among the various Old World peoples westwards of Polynesia were not used among the Polynesian islanders, who, as we have seen, follow the Northwest Coast Indians and the ancient Peruvians in their preference for varieties of conventional blunt clubs. We have seen, however, that there is one notable exception: the sling was an important projectile weapon in Polynesia. Linton writes in his Ethnology of Polynesia and Micronesia (1926, p. 108): "The sling was known everywhere, and was an important weapon in the Carolines, Marshalls, Hawaii, the Marquesas, the Society and Cook groups, and to a lesser extent in Samoa. It was little used in the Gilberts, Tonga, and Fiji, while the Maori employed it mainly for hurling red hot stones into the besieged towns to fire the thatch."

Buck (1933, p. 134; 1945, p. 13), and partly quoting him Weckler (1943, p. 11) also, consider the concurrent use of the sling in Micronesia and Polynesia as a reason for believing that the Polynesians arrived by way of Micronesia. The origin of the Micronesian sling is not specified, and since the sling is not a usual weapon in Indonesia it has never been pointed out as an element that could have spread all over the true Oceanic islands from that direction.

If, however, we turn to South America we find with Métraux (1949, p. 248) that the sling is distributed in a wide belt all along the Pacific coast from the Panama isthmus to the tip of Terra del Fuego. He writes (*Ibid.*, p. 252): "It was the favourite weapon of mountain Indians from Colombia to Chile..." A variety of specimens are known from the ancient desert graves along the Peruvian coast (Reiss and Stübel 1880-87, Pl. 76; etc.), and we have seen with Wölfel how the island types concur in detail with ancient Peruvian forms. Wölfel, who was confident that there was a source relationship between these slings, thoroughly disagreed with the following conclusion in a quotation (1925, p. 42) from Friederici: "When we evaluate the wide distribution of the sling through Melanesia, Micronesia and Polynesia, the question arises whether this weapon also does not perhaps belong to the elements which seem to bring the Pacific Islands ethnologically nearer to the American continent. But inquiry shows that this is not so." Friederici's argument for this negative conclusion is, as usual, that the Pacific islanders cannot have brought this weapon to America, since the sling has a very wide distribution in the New World, and cannot have a Polynesian background among the Pueblo Indians of New Mexico as well as among the mountain tribes around Lake Titicaca. To this we agree, but again, it does not prevent the Oceanic sling from having an origin among migrants from early America.

Although Nordenskiöld (1931, p. 22) mentions the sling as an American-Oceanian culture element, he is afraid of directly referring to it as an "Oceanian" element in America, since he finds that it must have been introduced into America "in an exceedingly remote past." Therefore, although referring to it in the text, he does not include it in his list. But Emory (1942 b, pp. 131, 132), seeing that the Peru-Polynesian sling is absent from Nordenskiöld's series of local parallels, stresses its great importance in Polynesia, and, without committing himself as to relationship or direction of migration, adds it to Nordenskiöld's list.

In his already cited work on the trepanation- sling- and club-complex, Wölfel (1925) also demonstrates how the various conventional wooden clubs of several of the islands find their striking counterparts in some of the traditionally carved wooden clubs of South America. During my visit to the Vienna Museum he further emphasized, partly by demonstrations, the very striking analogies in the wooden club forms of these two specific areas. The same observation has been made by several others. Moreno (1901, p. 576) writes: "...carved wood clubs, entirely similar to those of the Marquesas Islands, have also been brought from the ruins of Truxillo in Peru, and from Quillota in Chile, these being preserved in the La Plata Museum, while others have been discovered in Colombia, Ecuador, and other places in Peru."

Krämer (1904, p. 127) describes a wooden club excavated from a desert grave in North Peru: "It is completely covered with carvings, has the cross-bands of the Samoan *talavalu* club-form, and in one of the quadrangular panels on the head of the club is a little human figure [ill. by Krämer], which makes it possible easily and with certainty to determine the club as being Tongan. In 1897, I saw the club, when I inspected the collection of the Minister Zembsch in Lima, and Mr. Zembsch, who is known as a capable and careful collector, informed me that the club was found in an Indian burial hill near Trujillo in Peru. As to the age of the tomb nothing definite could be ascertained."[1] Nordenskiöld (1931, p. 21) illustrates another type of conventional and rather sword-shaped wooden club from Amahuaca, Peru, and considers it again an "Oceanian" element in South America. Emory (1942 b, p. 131) admits its resemblance in shape to some western Polynesian truncated clubs, and we may add that there is a great similarity to the fighting clubs of Samoa. Rivet (1943, p. 120) writes: "Wooden clubs, identic with the clubs of the Pacific Islands, have been found in Peru and among the Tlinkits [of the Northwest Coast]." Since conventional wooden clubs carved and ornamented in the manner seen from the Marquesas Group to Samoa are not only excavated from desert graves on the coast of Peru, but are depicted in the Early Chimu iconographic art as the standard fighting weapon of the early local era, we cannot, for chronological reasons, consider the archæological specimens under consideration to be stray and displaced Polynesian artifacts. If there is a connection, the probability of which seems to loom large in view of all concurring data, then the conventional club forms must have spread from the mainland to the islands.[2]

Fishing

Simple and composite fish-hooks

We have earlier pointed out that the Polynesian types of fishing-gear found no background or analogies in Indonesia or the continental West Pacific. The composite wooden ruvettus hook found its only parallel in the halibut hook of the Northwest Coast tribes and their nearest neighbours, and the relationship was strong enough to suggest an evolution from the one to the other, with adaptations to suit local requirements for fishing in the tropic waters. At the time, we promised to make a further reference to the two remaining forms of Polynesian fish-hook, the "simple", "incurved" or "circular" hook made of a single piece of shell or stone, and the "composite" hook consisting of a straight bone, stone, or shell shank with a bone point attached at the base. Both of these forms are found on Easter Island, the Marquesas, the Tuamotus, Hawaii, and Tahiti in the east, and straight across the ocean to New Zealand, parts of Melanesia, and Micronesia, but not further west.

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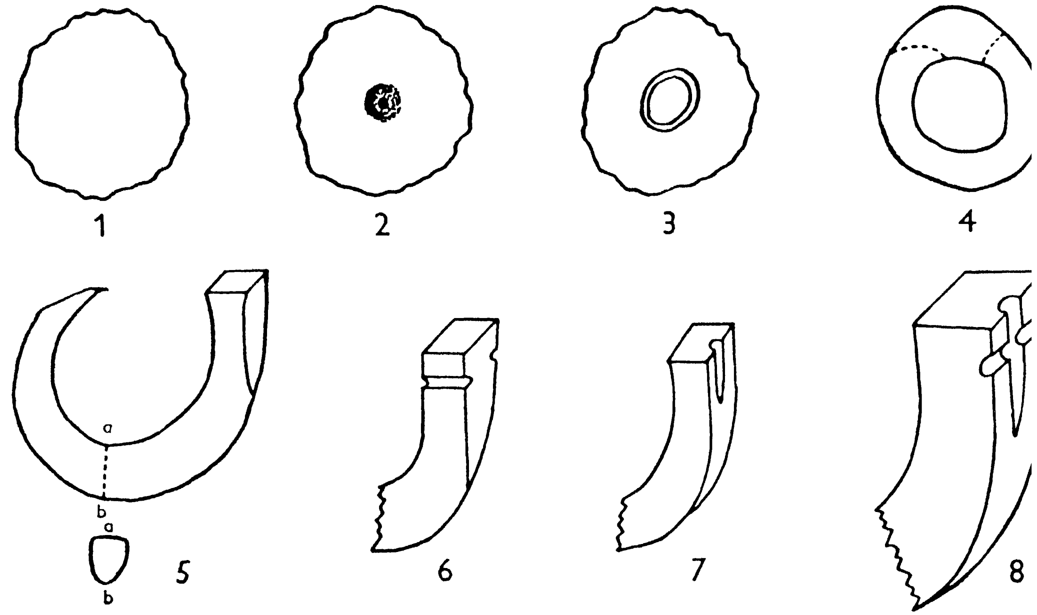
[1] This club is now in the Stuttgart Museum.

[2] *Human sacrifice.* In his monograph on *Polynesian Religion*, Handy (1927, p. 329) writes: "As regards human sacrifice, . . . it may have developed within the area as a result of expansion and elaboration of the cult. On the other hand, it may have been introduced. If so, it probably did not come from or through Indonesia, for this practice in connection with war ceremonial is not typical of Malaysia or Southeast Asia. Nor is it typical of Melanesia or Micronesia. Turning eastward, however, it is distinctly characteristic of the Mexican and Peruvian religions; even the manner of killing the victim in the Marquesas where the heart was torn out and eaten by the priest resembles the Maya practice. It is possible that the custom was carried from Polynesia to America; but it more likely was borrowed by Polynesia, where on important political occasions and in time of war human victims came to be substituted for the simpler offerings of fish. The fact that the Maori sacrificed war captives to Tu, as did the Society Islanders, Marquesans, and Hawaiians, indicates that the practice must have been fairly ancient in Polynesia, antedating the fourteenth century when most of the Maori went to New Zealand."

The composite fish-hook is absent from the Cook Islands and the simple one from Tonga, Samoa, Manihiki and Mangareva, but otherwise both forms generally occur together.

The Ekholm exhibit (entitled "Across the Pacific") at the American Museum of Natural History in New York in 1949 called attention to the fact that both these forms of fish-hook are found archæologically in ancient America. So far, the simple or circular fish-hook, in a form almost identical with the one of Polynesia, has been discovered at different points on the Pacific coast, including Southern California (Robinson 1942), Southern Ecuador (Ferdon 1950 a),[1] and Northern Chile (Uhle 1922 b; etc). Plate LXXXVI and LXXXVII illustrate some of the material compared in the Ekholm exhibit, with a few additional data included here from early New Zealand.



Methods for manufacture of circular shell fish-hook, Carolina, Ecuador. (After Ferdon 1950 a.)

It is important to note from Duff's excavations among the earliest human deposits in New Zealand, that is among the "Moa-hunter" remains from the latter part of the first millennium A. D., that *both* these South American types of fish-hook were present, and were the only ones found in this early period. As can be judged from the illustrations (Plate LXXXVII **4**, **5**, **6**) borrowed from Duff's work (1950, Fig 51, Pl. 36-38), these earliest known Pacific island specimens concur with those from Arica, on the Pacific coast below Tiahuanaco, to a much more striking degree than do any of the more modern specimens collected among the historically known Polynesian tribes.

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[1] Ferdon's excavations at Carolina, on the coast of Southern Ecuador, uncovered more than 200 crescent or circular fragments of shell objects, of which 77 were identifiable as whole or broken fish-hooks. Seventy-three were of the circular form under discussion, and 4 had a straighter shank, all made from a cream coloured shell. With regard to the chronology of this stratigraphic material, Ferdon writes in his preliminary report: "...it is quite possible that the lower and middle levels of the Carolina trench may belong to what is now termed in Peru the 'formative' period. This, I believe, is the same period to which Bird assigns his pre-ceramic shell fishhook culture of northern coastal Chile."

We may also note that Best (1921 a, p. 296, fig. 1) illustrates one of these ancient stone-shanked Maori fish-hooks which has the bone point still attached, and on this specimen feathers project from the lashing where the bone point joins the stone shank, showing that the ancient fishermen of New Zealand, like those of Tahiti and Easter Island, followed the much earlier South American prototype also in this specific detail. Remains of quills from feathers were namely found in the same manner underneath the lashings of an equivalent fish-hook excavated from the early Arica culture (Plate LXXXVII **7**).[1]

Ekholm (1950, p. 350) seems well justified to claim with reference to his comparative illustration (see Plate LXXXVII **8** below) of two East Pacific stone hooks of the incurved circular type: "These beautifully made stone fishhooks from Easter Island and California could hardly be more alike." Yet he also states (*Ibid.*): "Even more significant than the identical stone hooks are two other types found in combination on many islands of the Pacific and archæologically in coastal Chile. In both regions, the larger composite hook is made of shell, bone, or stone, and the smaller one of shell." In the caption to the actual display of these American-Oceanian parallels in fishing gear we read (Italics by T. H.): "The use of these two hook types at widely separated locations in the Pacific and the Americas suggests a common ancestral source. The recurrence of identical and similar forms implies rather direct diffusion, which may have been the case in some instances, but cannot apply to all. *The oldest known occurrence of the two forms is in Northern Chile where they were used by the first inhabitants of the coast*, probably before 1000 B. C. All the others are either historic or proto-historic. An important technical difference suggesting that the Chilean forms are also the more primitive is the fact that they were made by sawing and filing whereas drills were widely used in the Pacific and in making the Californian hooks. The archæological record shows that these two hook types did not evolve in Chile but were brought there by a people with a fully developed fishing culture. From whence did they come?"

It would be a very hasty conclusion indeed to deduce that they came from Polynesia. The Arica fish-hooks were used by an ancient culture people who lived on the coast south of Peru 1 500 years or more before we have any evidence of man in any part of Polynesia including New Zealand. If their evolution of fish-hooks were not local, it should be sought elsewhere on the large American coastline, where an infinity of prehistoric sites are yet untouched by archæologists.

It is evident that the earliest voyagers into the open Pacific island-world brought the specialized form of "circular" and "composite" fish-hooks along, since these forms spread to all the island settlements, and, since both are found *in a ready developed form with the earliest archæological deposits in New Zealand.* We shall therefore look to some older centre outside the Pacific island world for the origin of these imported forms of fishing gear. Indonesia and continental Asia fail to show similar remains in any period or area. But a millennium and a half—or more—before man began his migrations into the open Pacific, we know at least that some fishing-culture people settled the coastal area on the desert plains down below Tiahuanaco and began to fish the ocean with the very two types of gear for which we are searching mainland prototypes. From this early period onward, shanks and points, and incurved circular hooks, were deposited in the numerous graves of the extensive Arica burial-grounds where the models of prehistoric fishing rafts were found which were described earlier. And then, in the late centuries of the first millennium A. D., these same two types began to be deposited with the remains of the earliest settlers on New Zealand.

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[1] Best (*Ibid.*, p. 295) writes of the Arica type of New Zealand stone-shanks: "These curiously formed stone shanks for fish-hooks formerly employed by the Maori in his sea-fishing operations were often carefully fashioned and finished, the surfaces being ground smooth. Many of them were made from a kind of slate, but other forms of stone were employed. The use of these implements must have been fairly universal throughout both Islands, inasmuch as they have been found at many places from the North Cape southward to Foveaux Strait. Occasionally one formed of greenstone (nephrite) has been found, but these are rare, as also are greenstone points or barbs. It is of some interest to note that many natives of the present day are quite ignorant of their use; some assert that they were employed in certain ritual performances, and one, aged seventy or thereabouts, had the hardihood to assure me that they are ear-pendants!" For further descriptions of these prehistoric stone-shanked New Zealand fish-hooks see also Best (1929, p. 30); Fisher (1935, Pl. 67); etc.

So far we know of no other *South* American distribution area for the specialized composite hooks, but Ferdon's excavations have recently discovered what was formerly unknown, that the circular form of shell fish-hook was extensively used at an early period also on the coast of Carolina, Ecuador, whereas Ekholm found two apparent specimens in the Panuco region of northeast Mexico. It is therefore not impossible that future excavations may add further data to our knowledge of the distribution of both these early local fish-hooks in America. At present we are satisfied to know that, in the long period of Andean cultural bloom that preceded the arrival of the first man on the Pacific Islands, Tiahuanaco's inhabitants had full opportunity of becoming acquainted with the two forms of hooks used for Pacific fishing by their nearest neighbours down on the ocean coast. It is, therefore, not incredible that these or other early Peruvian voyagers should have carried the ideas to oceanic islands down-wind off their coast.[1]

The possibility of return visits to America by individual craft

The indications that single craft from early Peru managed to visit Polynesia and then return—or that voyagers from Polynesia sailed east as far as the American continent—are very few indeed. Yet they should not be ignored. It is clear that if the ancient Peruvians, as shown in Part VIII, were capable of handling their sail and centre-boards in such a way that they could also cross into the wind, then nothing could prevent these spacious and seaworthy vessels from calling at islands in Polynesia and returning thence to Peru. It should however, be borne in mind that the *first* voyagers or refugees from pre-Inca Peru, being early enough to find the lonely islands uninhabited, would have been likely to make them their home and therefore never return to Peru, where hostile neighbours could at any time make life uncertain whether in the mountains or on the coast. In later periods, as in Inca times, Polynesia had little to offer the Peruvian merchants, who in view of the tremendous distance there and back, could benefit more from barter trade northwards or southwards along their own coasts. Thus, there is little reason to suspect that many two-way voyages from South America took place in pre-Columbian time. On the other hand, as was pointed out earlier, a boat-load of neolithic Polynesian warriors who had managed to struggle to America would have been lost in the multitude of local cultures and would have been quite unable to affect the early American way of life. Such stray Polynesian voyages east *might*, however, have been made at the peak of the Maori-Polynesian navigation period in recent centuries, especially if the Maori-Polynesian newcomers could learn from their island predecessors that land was to be found beyond the horizon up-wind. But such a journey would indeed not be a natural drift voyage, nor would it of chronological reasons create the culture parallels between Oceania and the New World already referred to.

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[1] Fish-nets were as common in early Peru as on all the islands. See Pl. LXIV **2** and Pl. LXXXI **5**. It is wrong to suppose, as has been done, that the Polynesian custom of catching fish by poisoning them must be an Asiatic element in the island culture. As Friederici (1907, p. 88) writes: "Nearly all South America was a gigantic distribution area for the different modes of catching fish by poisoning the water or by means of poisoned meat. But also in Central America, in Mexico, with the Island Caribs, in the present southern United States, among the Pimas and in California fishpoisoning occurred." For the specification of fish poisoning plants, see Ernst (1881) and Radlkofer (1886). For fish-poisoning in Polynesia, see Stokes (1921). The balsa raft fishermen of ancient Ecuador used fish poisoning. (See page 539 ft.n.)

The only evidence of Peruvians having returned to their own coast from voyages to distant oceanic islands are the references to the trading expeditions by merchants from North Peru and Ecuador in the life of Tupac Inca, which led to the large-scale expedition of the latter emperor, corroborated by memories in Mangareva; and also the memories of similar voyages among the coastal people of Ica in South Peru, and Arica in northern Chile. We shall see in the next part that the Polynesians also have preserved a few memories of heroes who sailed back on visits to the distant Fatherland of the earliest gods, and that the descriptions given concur in details with a voyage to South America. To my knowledge, concrete archæological indications of visits by the Polynesian islanders to any part of the circum-Pacific continents are extremely few, none refer to the Asiatic mainland with Indonesia, and whatever evidence we have seems limited to a couple of casual finds in Pacific South America and on the Californian coast.

One of these possible evidences was the aforesaid conch trumpet of *Triton tritonis* excavated at Cañete on the coast of Peru. Another was published by Aichel (1925) in his paper on Easter Island palaeoliths in prehistoric tombs of Chile. He writes that an ancient Indian burial place was discovered when a railway cutting was being made at Llolleo, about two miles from the coast south of Valparaiso. While examining the graves together with Dr. Oyarzun, later director of the anthropological museum in Valparaiso, Aichel discovered two obsidian palaeoliths. He writes (*Ibid.*, p. 267): "As a burial gift in the interment of adults were found two obsidian instruments of palaeolithic type and of the same size, same method of manufacture, same material, and same form." He shows (*Ibid.*, pp. 268, 269) that Posnansky was of the opinion that obsidian palaeoliths found by him in the Andes resembled specimens from Easter Island, but that he had considered his finds to be unique in America. Now Aichel says of his own discovery: "Both of the two palaeoliths found in Llolleo... are completely identical with those of Easter Island, in material and form!" Further: "The finds from Llolleo cannot be placed in connection with the exportation of aborigines from Easter Island in historic times. People were indeed exported from Easter Island as labourers in historic times, but only to the guano territories, not to Central Chile. Apart from this, the cemetery of Llolleo is certainly prehistoric, that is at least pre-Columbian. Prehistoric relations between Polynesia and South America are also otherwise made probable. ... This discovery, which can place us in a position to support the very probable connection between South America and Polynesia, is under all circumstances of the greatest importance."

Métraux (1940, p. 416), generally opposed to any suggestion of Polynesian-American contacts before the arrival of European ships, also rejects the value of this discovery with the following comment: "The two specimens are no doubt from Easter Island, but the circumstances of their discovery are so obscure that they cannot be taken as evidence of early intercourse between Chile and Easter Island. For sixty years Chile has been flooded with artifacts brought from Easter Island by the crew of the Baquedano."

This comment seems to be rather hasty. It is difficult to see any obscurity in the circumstances connected with this discovery, as the local railway workers would hardly have dropped Easter Island palaeoliths into the prehistoric Indian tombs before the arrival of Aichel and his companions. It may also be presumed that Aichel and Oyarzun could distinguish between a modern 19th century Indian grave and one of purely pre-Columbian origin. It is also a little far-fetched to suppose that palaeolithic spear-heads from Easter Island would be of much value to a 19th century Indian anywhere. His grave would be more likely, in a time of European trade, to include among other artifacts a bit of scrap iron, an empty bottle, or some traces of European cloth. As the case stands it seems safe to consider the Chilean palaeoliths as never having crossed the sea with the *Baquedano* or any other ship of modern European type. On the other hand the identity in material and form with Easter Island specimens is in itself no proof that the said Chilean obsidian palaeoliths ever crossed the sea at all, although the type is best known at present from Easter Island. Brigham (1902, p. 10) points to the existence and extensive use of obsidian both in Easter Island and Mexico, and Bennett (1934, p. 426) states that flakes of obsidian are found in most Tiahuanaco pits. Most of the obsidian flakes found by him locally are unworked, but one piece, "roughly triangular in shape, had one edge retouched." We have seen that Posnansky, before Aichel, found worked obsidian in the Andes that directly reminded him of the Easter Island specimens, and Krämer (1906) wrote from Easter Island nearly twenty years before Aichel's claim: "The arrow or spear-heads of obsidian also recall very much in form the finds in the tombs from Caldera [North Chile] and northwards."

Although Aichel's obsidian palaeoliths are obviously an important indication of prehistoric contact between Easter Island and the South American mainland, it does not seem safe to conclude from what we now know that the two specimens under consideration are articles of barter carried *east from* Easter Island. Only if it could be shown that the Easter Island type of obsidian palaeoliths are unknown elsewhere in the Andes could we accept the view that aboriginal man had carried the Llolleo specimens from Easter Island to Chile. If this cannot be shown, it seems dangerous to overlook the possibility that both the Llolleo and the Easter Island palaeoliths are copied after some prototype form from early continental South America. (See Plate LXXXII **8**.)

The only other discoveries of a similar category are certain *mere* or *patu* clubs of definite Maori-Polynesian manufacture which have been found on the American mainland. A century ago Rivero and Tschudi (1851, Pl. 33, fig. 1) illustrated a genuine Maori *patu onewa* of greenish amphibolic stone found by Tschudi in a prehistoric tomb near Callao (Huacho) Peru. Shortly afterwards, Klemm (1854, fig. 46) reproduced a quite similar Maori *patu* of brown jasper, stating that it had been discovered in Peru, without further specification. In recent years Imbelloni (1930) took up the problem underlying these finds in a comprehensive study of Maori-Polynesian stone clubs of the *mere* family found in the New World.[1] Imbelloni's rich material in relation to a common origin between North American and Maori-Polynesian club forms was reviewed in Part II. The bulk of his most dependable American material came from the North American Northwest Coast tribes, where such specialized forms of short clubs were found to be not only very common, but typical and essentially locally evolved weapons of war. These Northwest Coast clubs were not entirely identical with, but strikingly similar to, the historic Maori-Polynesian *meres*, and do most probably represent their continental prototypes. In South America the situation is strikingly different. Imbelloni points to the discovery of only three directly comparable specimens, which all seem to be of comparatively recent occurrence, widely scattered, and *quite indistinguishable* from genuine and historic Maori-Polynesian forms. It can be stated at once that these few South American specimens are imported from the islands; the question is only whether this took place before or after the arrival of European ships. The three specimens include the one already mentioned as reproduced by Rivero and Tschudi and the other illustrated by Klemm. The third specimen, according to Imbelloni (*Ibid.*, p. 338), was found on the side of the famous "Inca Road" near Villavicencio, in Mendoza Province in Argentine. In itself the specimen illustrated by Klemm carries no weight, as nothing is recorded connected with its discovery except that it comes from Peru. The Andean specimen from Argentina might have been brought there in post-Columbian time, although the chances of its having been lost in native warfare beside the Inca road seem not very much smaller than those of its having been lost or thrown there by European voyagers in historic times. We may note that this Argentine specimen was found where the Inca road goes fairly close to the site where Aichel found his obsidian instruments. This *may* be a coincidence. The remaining specimen, extracted by competent archæologists from an Inca grave at Huacho, seems on the other hand to resist any reasonable criticism.

Two other and assymmetrical *patu* clubs recorded by Imbelloni from the Andean region of Argentine and Chile are of a less definitely imported type. The fact that they are not directly identical with Maori specimens makes it less easy to suspect, in their case, a post-European interchange. About these specimens Skinner (1931, p. 195) writes in his review of Imbelloni's material: "In the opinion of the writer these two pieces do carry weight in the discussion of the problem of Polynesian contacts with America. It does not seem rash to suppose that they may be closely related to the assymetrical Maori and Moriori variety of *patu* through a not very remote common ancestor in eastern Marginal Polynesia. But such a important generalization requires a much greater number of observations in support than these two. Though it seems likely that future research may provide sufficient observations, Professor Imbelloni's conclusions are at present insecure."

Also Dixon (1933, p. 341) was concerned by the occurrence of Polynesian club-types in the continents to the east. He writes: "To attribute the American forms to Maori influence would involve serious difficulties, for we would have to postulate two separate contacts, one near Vancouver Island, the other in Southern Chile, since no yet conceivable pre-European trade or migration could account for the transfer of specimens from one end of the

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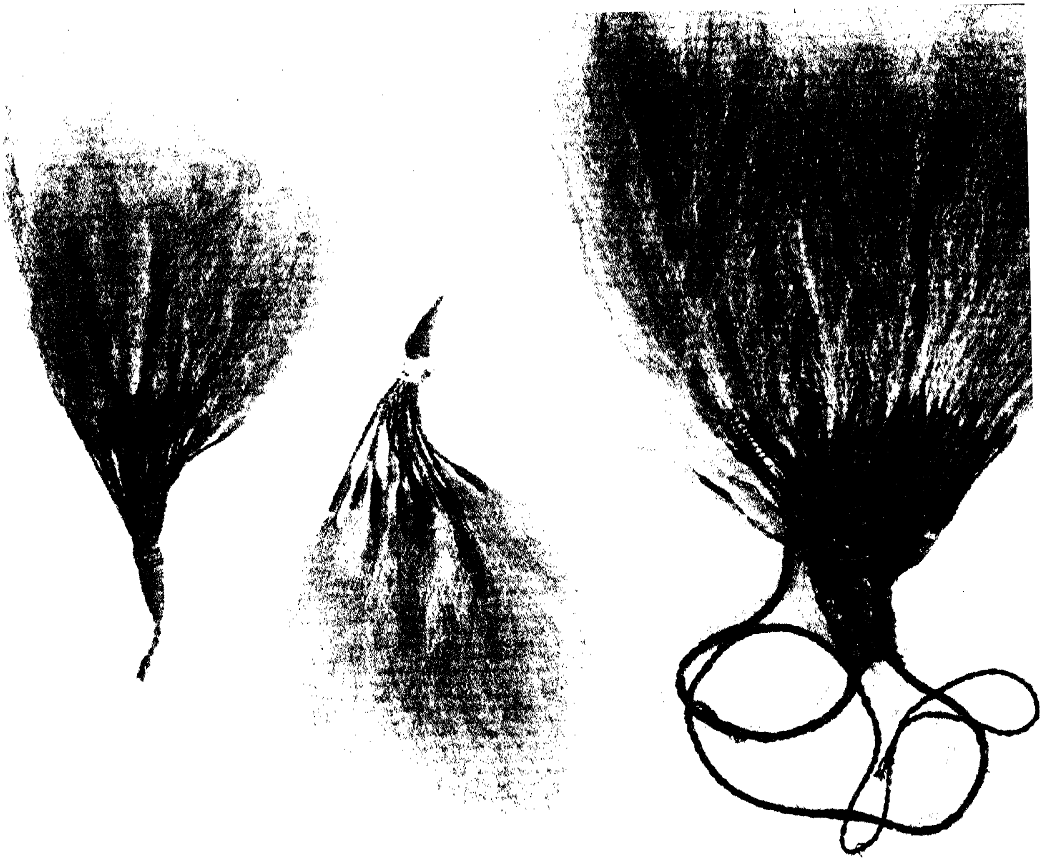
[1] Imbelloni (1928 a) also shows that the Polynesian term for their adze, viz. *toki*, reappears as the Araucanian denomination for the same implement in Chile. The same observation is made by Rivet (1943, p. 119).

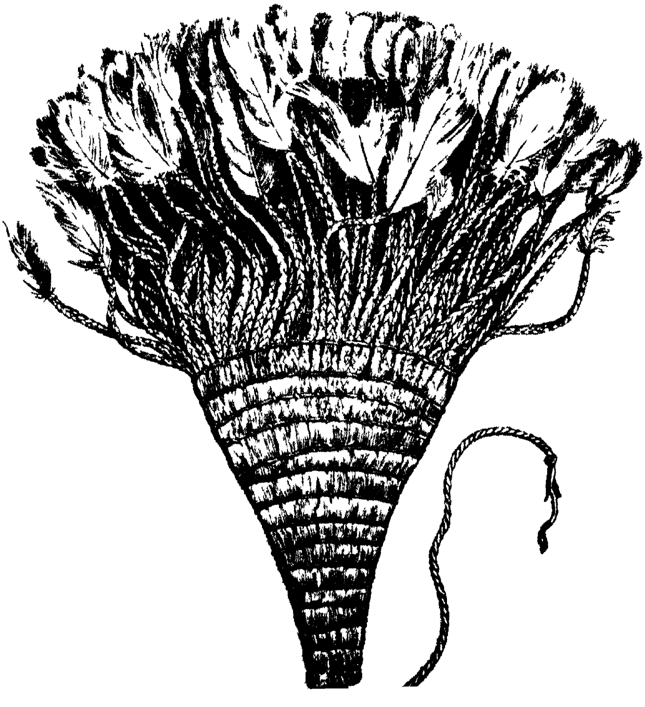
Americas to the other." It is clear, however, that these difficulties are simplified if the Northwest Coast tribes on and around Vancouver island, who have evolved their whole series of club-forms locally, brought them later with migrants into the island-world. The very few and sporadic specimens from the Andean area, especially the three of obvious Maori manufacture, may then have been deposited in Peru by more recent craft, some possibly in European times, but one almost certainly by the crew of an Inca trading raft or a late Maori-Polynesian canoe.

The fact that the important and conventional Maori-Polynesian stone clubs were brought to the islands by the last wave of immigrants to arrive, and were absent in the earliest local era, is shown also by Duff's earlier cited excavations in the "Moa-hunter" sites from the earliest New Zealand era. He writes (1950, p. 12): "There is a complete absence of any weapons, notably stone clubs of the *patu* type, ..."

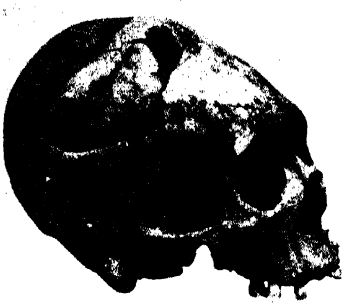
Whereas Skinner assumed a sceptical attitude towards a pre-European transfer of the aforesaid three genuine Maori clubs found in South America, Dixon (1933, pp. 341, 353) gave these finds more attention, and wrote, after pointing to the parallel club forms in Northwest America: "The South American situation is more puzzling still. Here we have three certain specimens, certain, that is, in that they are thoroughly typical Maori '*mere*', which it would be impossible to distinguish from known New Zealand examples. One of these is labelled as 'From Peru', one was found by an Indian near a trail in western Argentina, and one was excavated by von Tschudi in 1841 from a grave on the Peruvian coast near Huacho. The first two are to be explained again, I believe, as stray curios brought by late eighteenth—or early nineteenth—century explorers or others to Peru or Chile; the third, however, refuses to be fitted into any such picture. For although we have no adequate details of the character or age of the grave from which it was dug, the closely adjacent sites of Supe and Chancay yielded to Uhle prevailingly pre-Inca materials, ranging from late-Chimu back to Tiahuanacoid styles. It is, of course, possible that von Tschudi's grave was of Inca age, but it would seem rather more probable that it dated at least to late-Chimu times, and so would be assignable to somewhere about the thirteenth or fourteenth centuries." This is, as Dixon states, in "a period roughly coincident with the coming of the Maori to New Zealand..." Puzzled by this fact, the author claims that "the problem of these '*mere onewa*' in America seems insoluble." And: "...in this *one* case at least, contact must have taken place. What seemed to have been demonstrated to be impossible, did actually occur." (See Plate LXXXII **7**.)

The next archæological indication of a possible Polynesian expedition to the New World comes from the Santa Barbara region of Southern California, where the American mainland is closer to Hawaii than is Tahiti. In his paper on "Shell Fishhooks of the California Coast", Robinson (1942, p. 57) writes: "Familiar to every student of Pacific ethnography are the characteristic incurved fishhooks used by the natives throughout a large part of Polynesia and Micronesia. ... The object of the present paper is to give a description of and the results of experiments with the incurved shell fishhooks from the Santa Barbara Channel Islands and the mainland coast of southern California—the only known area outside of Oceania [and South America] where this type of hook has been found." Part of the author's conclusion is (p. 62): "The Polynesian-Micronesian fishhooks of incurved type are similar in pattern to the Chumash hooks [of Santa Barbara] and obviously work





1 *Pavahina*, or head ornaments from the Marquesas Islands. These conventional insignia were made of tufts of white beard from old natives, attached to separate strings of braided fibres, which again were united fan-shape at the base and terminated in a string for attachment to the front of the head-dress. (Photo: *Brooklyn Mus.*) **2** "Feather ornament probably worn in the head-dress". From prehistoric grave at Ica, Peru. (From *Montell 1929.*)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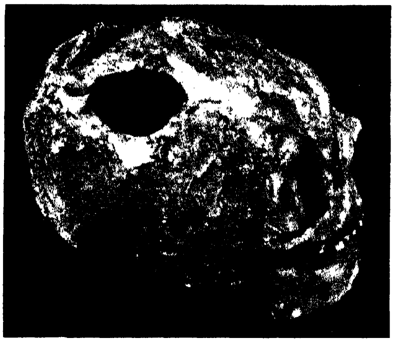
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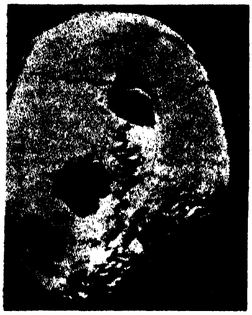
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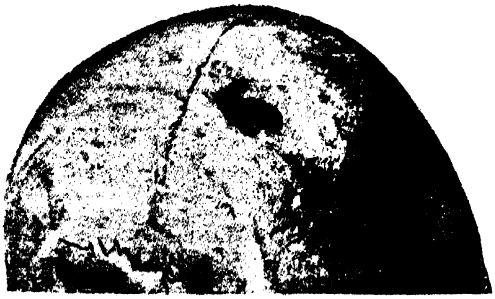
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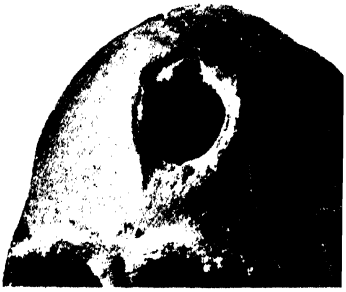
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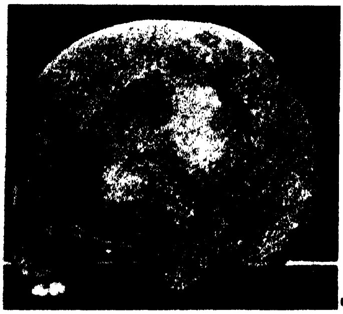
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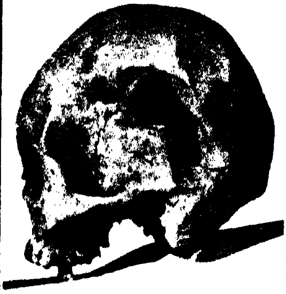
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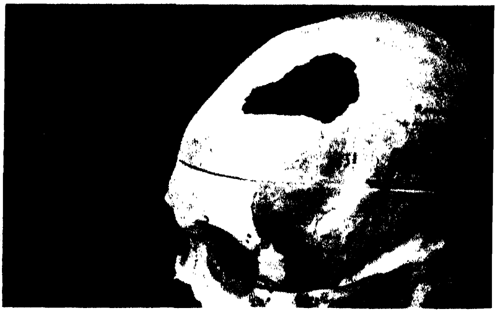
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1, 2 Trepanned skulls from Peru. (Photo: *Amer. Mus. Nat. Hist.*) **3** Prehistoric Peruvian trepanning for tumour, disclosed by local bulging of the skull; and **4** Peruvian skull with multiple trepanation openings. (From *Freeman 1924*.) **5, 6** Trepanned Melanesian skulls from New Britain; and **7** trepanned Maori skull from New Zealand. (From *Wölfel 1925*.) **8** Apparently unsuccessful trepanation from the Tuamotu Islands. (Photo: *Amer. Mus. Nat. Hist.*) **9** Trepanned skull, Nukuhiva Island, Marquesas. (Photo: *Musée de l'Homme*.)

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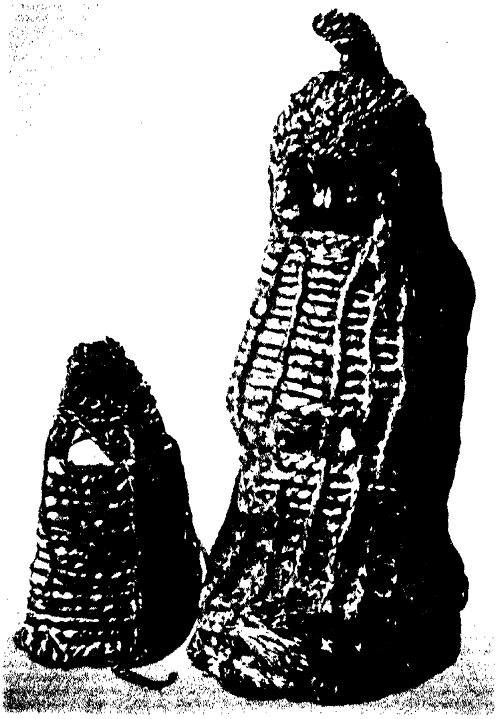

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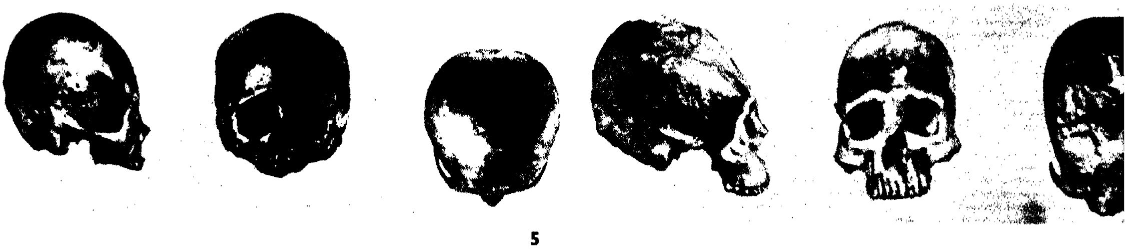

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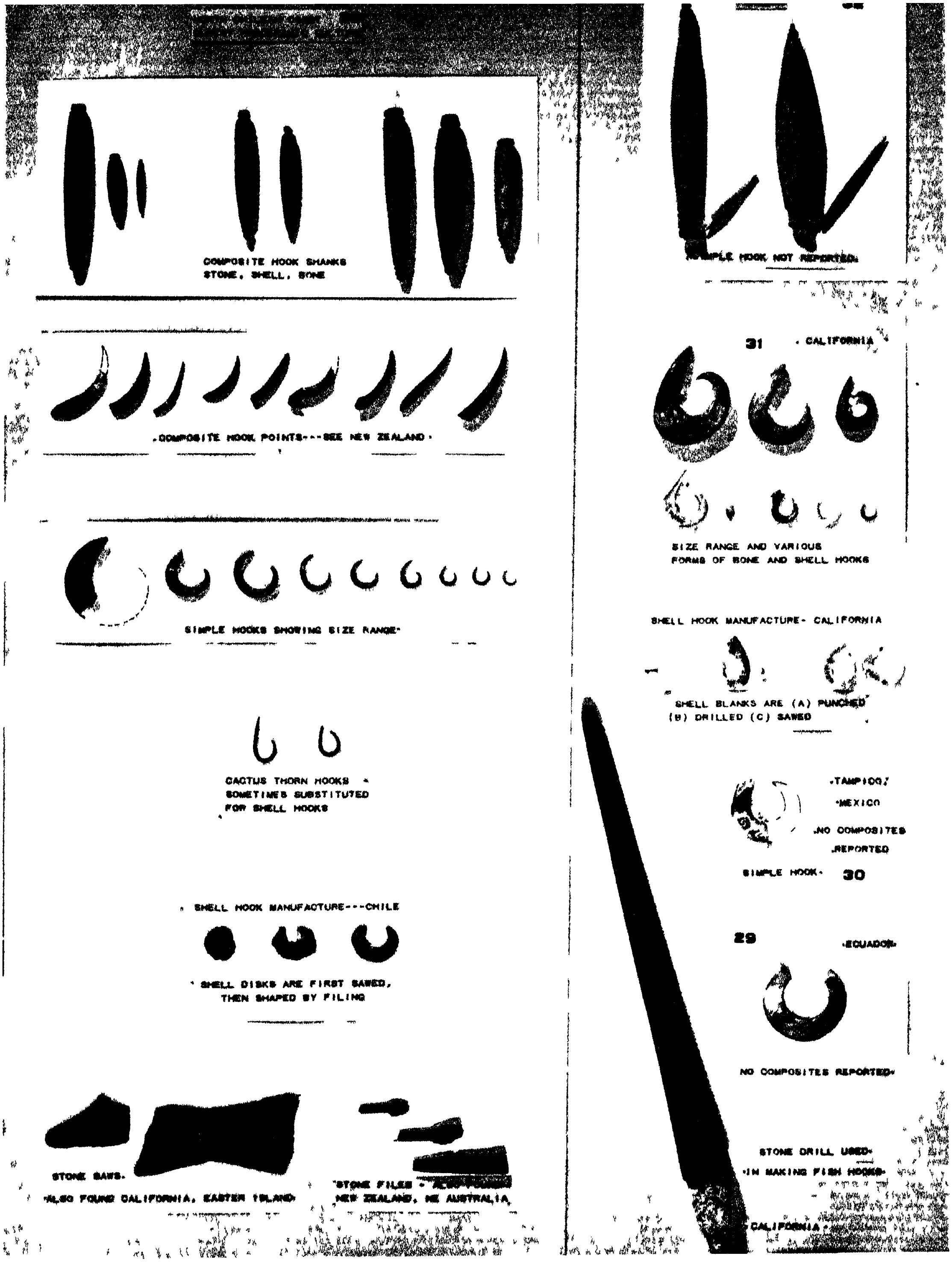
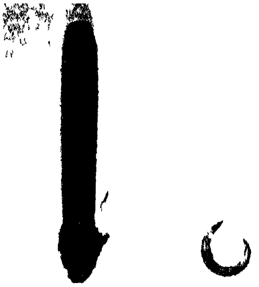
1 Mummy head from ancient Peru. (From *Dawson 1928.*) **2** Prehistoric Peruvian bandage with finer gauze than that used to-day. (From *Freeman 1924*; in *Mus. Anthrop., San Diego, Calif.*) **3** Mummy bundles of child and adult, Tiahuanaco; and **4** mummy of adult male from the same highlands. (From *Dawson 1928.*) **6** Long-headed skull from prehistoric Tiahuanaco with C. I. 71.97 compared with **5** round-headed skull from the same vicinity with C. I. 92.80. (From *Chervin 1908.*)



American fish-hook manufacture as shared with Polynesia. From the comparative exhibition "Across the Pacific" at the American Museum of Natural History, New York. (Photo: *Amer. Mus. Nat. Hist.*) The two basic forms of Polynesian fish-hooks were early prehistoric in America, but unknown in Indonesia.



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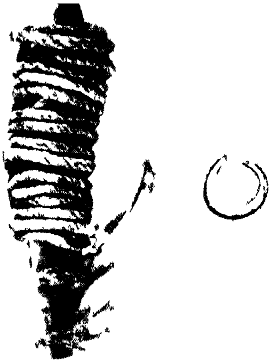

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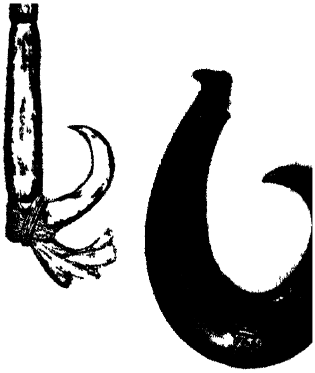

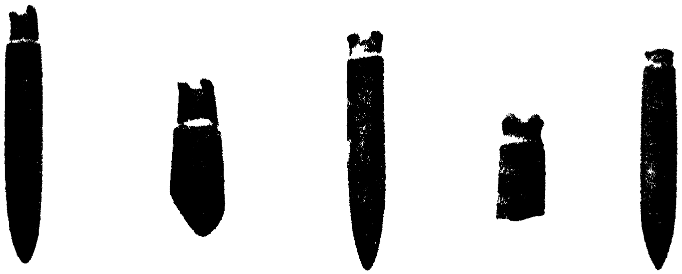

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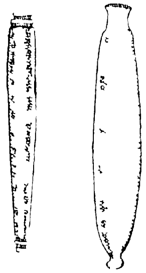

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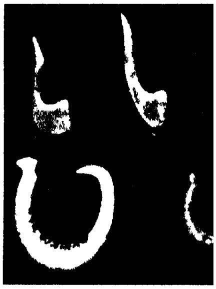

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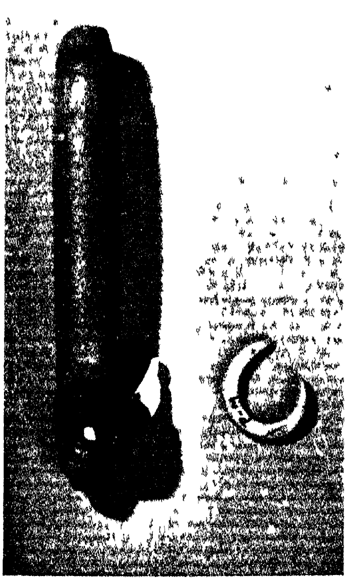

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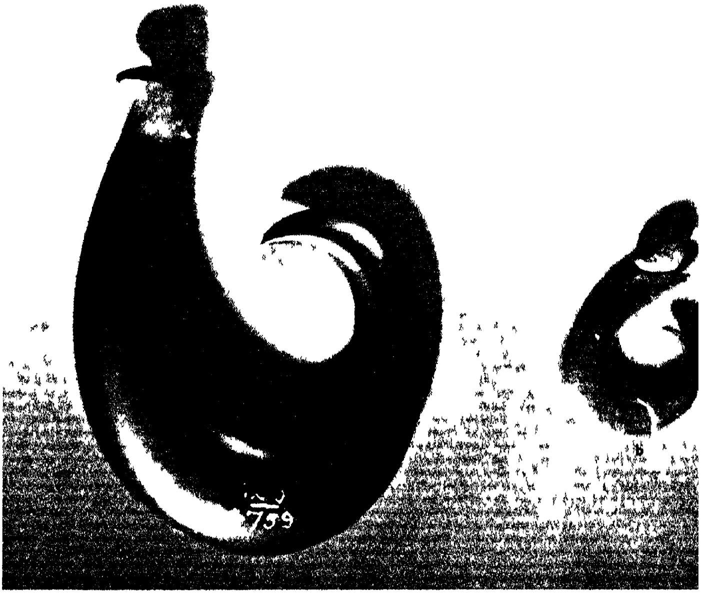
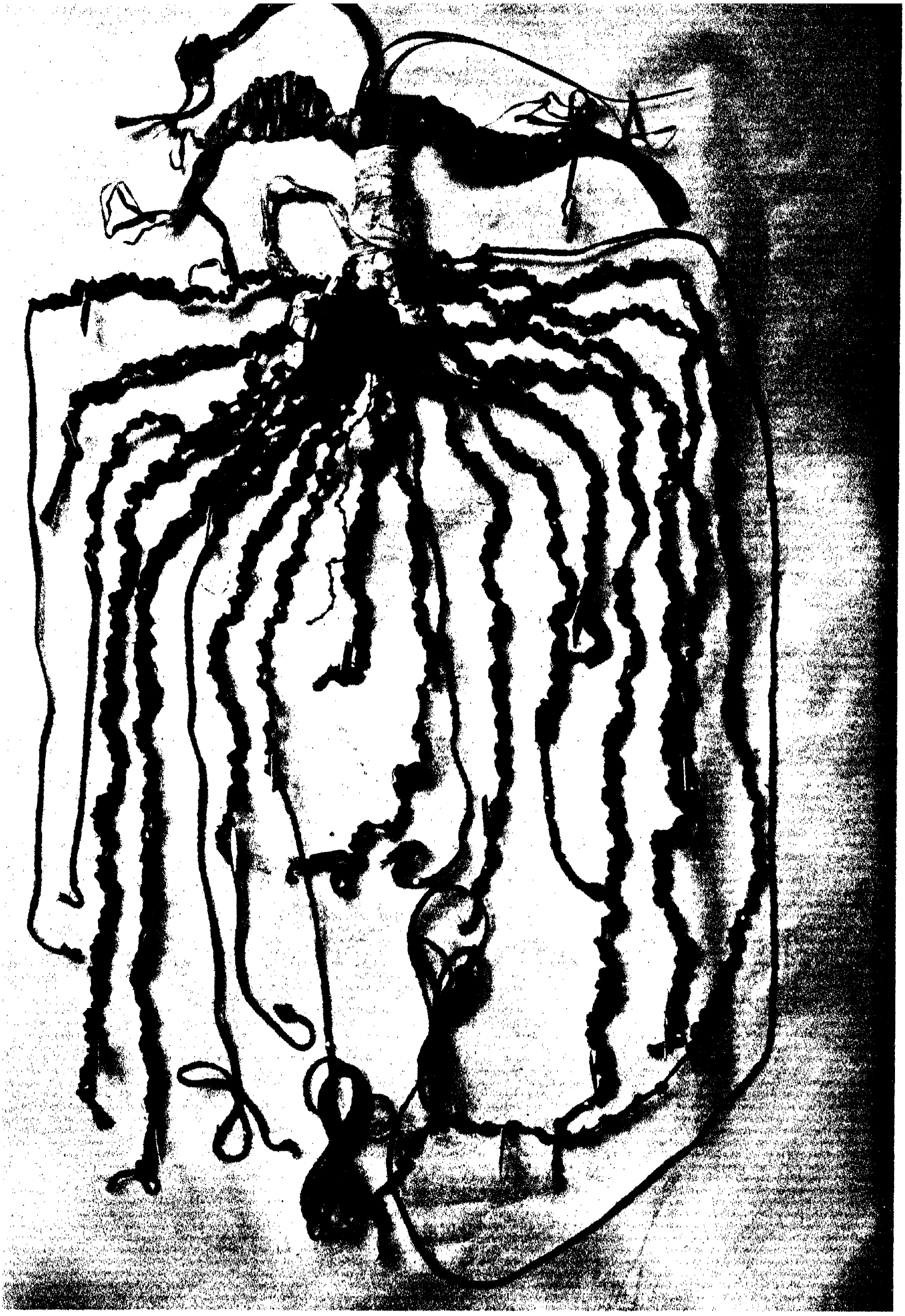


Composite and circular fish-hook from **1** Arica on the Pacific coast below Tiahuanaco, **2** Tahiti, **3** Easter Island. The American specimen greatly antedates the era of man in Polynesia, and also shows remains of feather attachment at the base. (Photo: *Ibid.*) **4, 5, 6** same type of stone shanks, points, and circular hooks excavated from earliest New Zealand Moa-hunter period. (From *Duff 1950 b.*) **7** close-up of Arica prototype of Polynesian composite hook; and **8** Easter Island (left) and Californian stone fish-hooks compared. (Photos: *Amer. Mus. Nat. Hist.*)



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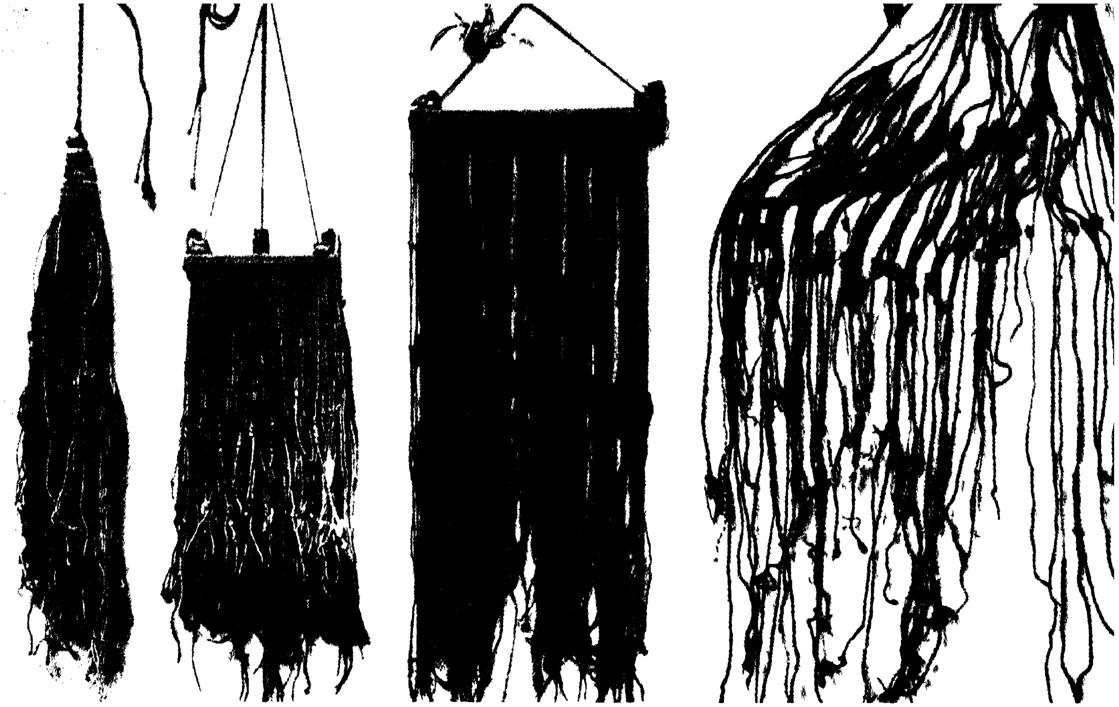

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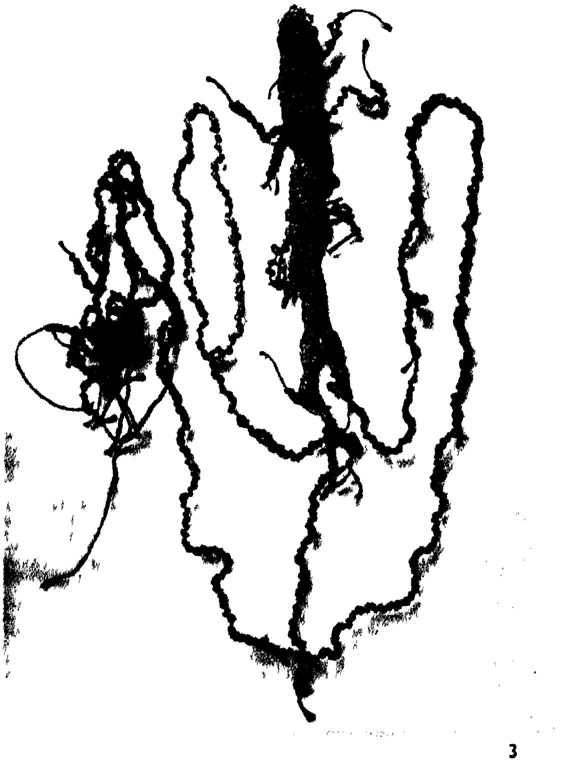

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Plate LXXXVIII

Genealogical recording from the Marquesas Islands. (Photo: *Mus. f. Völkerkunde.*)

Plate LXXXIX

1, 2 Quipus or knotted string records from ancient Peruvian graves, and **3** from the Marquesas Islands. This peculiar mnemonic device, consisting of a system of strings with knots, was favoured throughout ancient Peru and was also carried by the Polynesian ancestors to widely separated islands. (Photo: *Mus. f. Völkerkunde.*)

Easter Island. Where South America and its early megalithic high-cultures end, Polynesia and Pacific Island prehistory begins. (Photo: *H. Martini.*)

on the same principle." And (p. 64): "That the shell hook is not a very ancient element in Chumash culture is clearly shown by the recent archæological investigations of Rogers and Olson in the Santa Barbara region, where this type of implement occurs only in relatively late period sites. Stratigraphic work by Walker at a large site near Redondo Beach, California, indicated the shell hooks to be of relatively recent introduction, for they were found only in the upper levels of the midden."

In his publication on "The Plank Canoe of the Santa Barbara Region, California", Heizer (1938, p. 216) refers to the possibility of Polynesian relationship, and says with regard to the archæological evidence treated by Olson: "His 'cautious acceptance of the possibility of such Oceanic affiliation' is presumably, in the light of evidence, the only sound approach." And [footnote]: "It is with full appreciation of the various 'possibilities' such as a Polynesian boat containing, if not live Polynesians, at least curved shell fishhooks, etc. drifting ashore on the channel. In the absence of definite proof of this and in view of the data presented, I have cast my ballot in favour of local invention and against extralimital proveniance. – I do not press my point which is only an opinion. If some other writer furnishes stronger evidence indicating an introduction from outside, I shall be the very first to accept it. Kroeber outlines the elaborate cosmogony of the Luiseño, (present perhaps also among the Gabrielens) the pattern of which is 'thoroughly Polynesian in character, and without parallel in America.' The curved shell fishhooks are pointed out as 'strictly Micronesian in form.' Here, however, specific Southern Californian-Oceanian cultural resemblances seem to end."

In Northwest America nothing is published which seems to indicate a visit from the islands rather than vice versa. It is thus apparent that, whereas the evidence of early human migrations *from* the Northwest Coast Archipelago and Andean South America *to* the islands is ample and deeply rooted, the signs of inspiration *from* the islands *to* America are exceedingly few, and apparently limited to the territory of the late Inca Empire and possibly the Santa Barbara region of Southern California. Yet we cannot know with certainty whether or not the Santa Barbara incurved fishhooks represent an inspiration from the East Pacific islands rather than from one of the aboriginal American manufacturing centres of incurved fish-hooks further to the south.

Polynesian cultures antedate Polynesian migrations

We have seen that, upon a comparison with America, we find very little fundamental originality in the Polynesian island culture. Styles and details may vary considerably from one island to the other, and important elements which are present in one island may be absent from the next, but in general all the basic inventions, conceptions and customs are shared either with the older Andean cultures or with the historically observed occupants of the Northwest American Coast Archipelago. A number of Polynesian elements are shared also with Indonesia, like the beating of bark cloth, terrace cultivation, the nose flute, or the custom of tattoo. But in every case such Indonesian-Polynesian elements have been present also since pre-Columbian times in the Andean area or on the Northwest Coast, and therefore are worthless as indicators of migration unless in conjuction with corroborative evidence that can stand on its own merits.

Exceptions are the outrigger, the pig, the fowl, and a number of crop plants all of which, however, have been diffused from island to island, not by migrants from Indonesia, but through pure barter and trade with the adjoining groups of Melanesia.

It may seem rather surprising that very little local evolution appears to have taken place inside the Polynesian island world, in spite of the marked intellect and capacity of the Maori-Polynesian island people. Yet this phenomenon—which is in itself born out by what sporadic evidence we possess in Polynesian archæology—has its very natural explanation. Not only have the Polynesians lived for comparatively few centuries on their oceanic islands, but apart from the various settlers that reached these groups in different waves, they were completely isolated from any outside inspirations and impulses worthy of mention but those from their more primitive Melanesian neighbours west of Tonga and Samoa. In addition, few cultures have been based on more conservative principles than those of these ancestor-worshippers. Nowhere do the Polynesian philosophy and way of life differ more from our own than in their attitude towards the past. While we consider our earliest ancestors as barbarians, and strive for progress towards an undefined ideal hoped to be found in the future, the Polynesians considered their earliest ancestors as gods and divine beings, and strived to copy them and their way of living as best they could. There is yet another point which it would be unwise to ignore. When offshoots of continental cultures spread over small oceanic islands to become tiny and widely separated village settlements, the natural consequence would be stagnation, and probably even retrogression, rather than a sudden acquirement of new culture traits. Easter Island, for instance, may be an ideal landing place for an enterprising group of migrants from a mainland high-culture, but it is certainly not an ideal evolutionary centre for a primitive fishing tribe. All told we should not expect the mixed Polynesian culture to show much local evolution and basic originality. At the best we should be able to separate its various component elements and trace them back to some prototype form among the people still inhabiting the areas where the Polynesian ancestors formerly dwelt and laid the foundation for their culture. The dogma that the Polynesians evolved the many peculiarities of their culture as they pushed on from one island to the next up against the wind, is born and nourished by the consequent failure of finding proper counterparts—in Indonesia or the far West Pacific—to the many remarkable features of the Polynesian island culture. What we have found to exist on the mainland coast to the east of the islands, is only what rightly should be expected to exist in the former homeland of the people who settled Polynesia.

The fact that Polynesian culture had its roots abroad and was carried to the islands in a fairly mature state, relieves us of another essential problem connected with the original island discoveries. We see now that the Polynesians' ancestors found their way to the islands in the open East and Central Pacific not while they were still rude barbarians with an undeveloped and primitive archaic culture, and not up-wind, but at the very peak of their own mainland evolution, and in a natural spread down-wind. We can therefore better understand what has actually happened in the open Pacific if we admit that Polynesia is a melting-pot for already developed peoples and cultures whose homes were the two maritime centres of the American west coast; namely the raftsmen of the Andean high-cultures and the canoe-builders of the Northwest American coast. The latter were simply lucky enough, for purely natural reasons, to hit upon the Hawaiian chain, where information was already available about other islands to be found in the south. The people who were there in advance to yield this information, were the first and actual discoverers of the islands. *Their* early arrival represented only one of the many outstanding results which had crowned the spectacular mainland career of one of the world's leading neolithic high-cultures, which had first flourished and then been displaced at the very source of the principal water-road into the East Pacific.

PART X

MYTHS AND MEMORIES

MYTHS AND MEMORIES

It is only natural that myths and memories have played a major part in many attempts to trace the origins of the island tribes of Polynesia. Firstly, because the Polynesian migrations have taken place in a comparatively recent period of human history, and should therefore be expected to survive to some extent in local memories, and secondly because the Polynesians were genuine ancestor-worshippers for which reason most of their lore and learning was focused on past historic events.

But the Polynesian custom of clothing direct speech in metaphor, especially when alluding to sacred persons, places, or events, has in most cases obscured the information contained in the lore dealing with the original island discoveries. The Fatherland was the sacred abode of the gods and earliest chiefs, and like it was *tapu* on some islands even to look at the living king, so the Fatherland of the sacred progenitors was also a topic that could not generally be straightforwardly discussed in common speech. Although the Polynesian myths and memories, from the earliest time of cultural contact, have fascinated European visitors and fired their imagination, the many attempts to combine them with anthropological theories of Fatherland in Indonesia have not quite succeeded. None of the Indonesian islands, nor the itineraries from them to Polynesia, agree with the geographical descriptions and voyaging directions preserved in Polynesian legends and traditions, even if we ignore for a moment the even more important obstacles raised by archæology, ethnology, oceanography and history. Beyond the above-mentioned religious belief that the spirits of deceased Polynesians entered a hole into the underworld in company with the setting sun, students of Polynesian lore have not agreed upon anything else that would locate the legendary Polynesian Fatherland in a specific locality in the direction of Asia.[1] Early Polynesian genealogists, like Fornander (1878), and others with him, did not hesitate to go as far as Arabia to pick the nearest locality which was thought to match the legendary description of the Polynesian Fatherland. But modern interpreters of Polynesian legends, like Buck (1938 a, map), distrust such extreme migration routes and simply plot the hypothetical Polynesian trek as an arrow drawn at random from some unspecified point at sea in the West Pacific, and in a casual arc through the Micronesian ocean bearing down upon Samoa. Samoa is given as the only fixed point on this entirely imaginary line, and even then it is chosen for no other reason but because of its geographical location as the Polynesian façade towards the west. Compared with the theorists who draw Polynesian migration routes eastwards from Arabia, those who begin at an unspecified point at sea off Indonesia are indeed more careful—but also more vague, less specific, and equally hypothetical in their approach.

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[1] There are exceptions even to this solar itinerary in Polynesian religious beliefs. In Fatuhiva of the Marquesas group the spirits are believed to travel back east to the Fatherland, starting from a certain spring called *Te-vai-toetoe* in a small valley on the east coast of the island. (Handy 1923, p. 251.) The Moriori of the Chatham Islands believed that the spirits went to a certain cave on the east coast of their main island, and thence started in an easterly direction towards the Paradise. (Best 1925 a, p. 143.)

The failure to find any agreement between Polynesian memories and any modern theory of a Polynesian voyage from the Old World has in many quarters created a very sceptical attitude towards the correctness and value of Polynesian tradition. Yet inside Polynesia we have interesting examples which time and again verify that Polynesian tradition for many generations can be very carefully preserved through mere oral inheritance. As we have seen, this has been particularly emphasized by Buck in his various publications. In his paper on "The value of Tradition in Polynesian Research" (1926 a, pp. 181, 182) he writes: "Many people consider tradition to be so full of error that it is of little or no value in ethnological research. It seems natural that the less a person is capable of trusting his own memory, the more he distrusts tradition. This attitude of condemning without investigation is, to say the least of it, unscientific. In seeming contrast to the distrust of tradition is the ready acceptance of unverified printed matter. It is, however, just as unscientific to accept the one without confirmation as to discard the other without investigation." Also: "There is no comparison between the inaccurate writings of a globe-trotting European and the ancient traditions of a cultured barbarian." His conclusion is, as we have seen, (*Ibid.*, p. 203) that: "From a purely scientific point of view, tradition is of the greatest value in ethnological research regarding the Polynesian race."

An example illustrating Buck's point is presented by St. Johnston (1921, p. 90). He writes of the Polynesians: "In making their long voyages of colonization, the voyages of their great 'trek', they were especially careful to keep accurate details and to hand the data down to their descendants. It was the proud history of their race. The names of the vessels were recorded, the names of the chiefs and their wives, and even the names of the steersmen. Many separate families would go in these large vessels, and each man with his wife and children would have a portion of the thwarts allotted to him. A Tahitian 'history' records that certain canoes started on a voyage from Tahiti well provisioned for a long expedition, a journey of exploration, but with every intention of returning. The names of the canoes and the people were preserved in the traditional song, taught by the priests and elders from one generation to another. *But they never returned.* Many generations afterwards, investigation of the Cook Islands histories brought to the light record of *these same canoes and same people* having safely arrived at Rarotonga (Cook Island), with full details in a manner that only the Polynesian delights in." Fornander (1878) similarly noted that "in collecting Hawaiian chants of the *Kualii* dating from about the seventeenth century and containing 618 lines, one copy collected on Hawaii and another on Oahu did not vary in a single line; of the *Hauikalani*, written just before Kamehameha's time and containing 527 lines, a copy from Hawaii and one from Maui differed only in the omission of a single word."

Although we have therefore good reason to consult Polynesian memories in a discussion of their own tribal past, we should also be alive to some few misleading factors. Firstly, as we have earlier seen with Fornander, priestly speculations and vanity, at the time of the Maori-Polynesian migration vortex some twenty to thirty generations ago, strove to amalgamate traditions of the earlier stock with those of the new, earlier gods and heroes being replaced or supplemented by new ones, and, on most of the islands, royal lines made to start from a new progenitor. It is even possible to see a marked distinction in the character of most island traditions that precede this revolutionary period. As Shortland (1856, p. 1) has pointed out, the Maori traditions fall into three different categories. One class of memories begin with the time of the last great pan-Polynesian migrations which brought the present Maori to New Zealand. These are purely historical traditions, frequently rendered with practical details and often with very little metaphoric phrasing. The second class of traditions are inherited from the earlier era and consist of legends of the human demi-gods and heroes who were the first to voyage into the ocean from the sacred home of the gods. These are often vague and allegoric allusions of a more sacred nature, and in their references to the most remote and mythical ages they gradually merge into the third class—the purely religious conceptions in which the earliest hierarchic progenitors are supposed to have descended from the true gods in the age of darkness and primeval creation.

We have earlier dealt with a number of Polynesian traditions of all three categories. We have found (Part III) that the more historic traditions in wide areas of Polynesia converge back to a focusing centre in *Hawaiki*, which was identified with the previously unsuspected Hawaiian group in the far northeast Pacific. We have also seen (Part II) that certain mythical heroes and religious conceptions imported by these newcomers via Hawaii were found to be preserved also among the ancestor-worshipping Kwakiutl of Vancouver Island, still higher up in the North Pacific, where America is close to Asia.

There are many indications to the effect that in much of Polynesia the highest cultural standing prevailed already before the last warlike invaders came by way of Hawaiki. This is only natural when we compare the culture of pre-Inca Peru with that of the Northwest Indian habitat of the eleventh or twelfth century A. D., and consider the possibility that both areas in turn contributed to the peopling of Polynesia. Handy (1930 c, p. 5) also came to the conclusion, in his study of Polynesian origins, that the last arrivers had an "inferior mythology, vague concepts." This indeed was not so among the earliest and culturally more advanced migrants who brought the South American crop plants and great stone masonry into the same islands. It seems apparent that most of the Polynesian legends and myths of the second and third class have derived from these earliest colonizers of the islands, and that later generations of mixed descent found it easier to memorize sacred legends and beliefs, and use the same weapons and fish-hooks, than to carry on the more exacting monolithic and megalithic work, the manufacture of cotton cloth, or the art of inscribing signs on tablets. At any rate the complex Polynesian lore, in spite of the vague concepts of the newcomers, is still rich in inherited allusions to ancestral god-men who dwelt in the distant Fatherland before they led their people out to the islands in the open Pacific.

The creation myths

Mother earth

Ratzel (1885-88, Vol. III, p. 666), one of the pioneers of ethnology, said regarding a comparison between aboriginal America and Polynesia: "One observes striking parallels ... in the highest degree with regard to the religious conceptions..." Several later observers, among them Mahling (1902, p. 87) and Schmidt (1913, p. 1055), have claimed that the fundamentals of South American religious views are repeated in Polynesia. In his monograph on Oceanian and American Indian ideas concerning the earth, Mahling (1902, p. 87) concludes: "The Oceanian and American Indian conceptions of the Earth reveal surprising similarities in their fundamental forms. The apparent differences concern the inner structures much less than the outward embellishment. F. Ratzel has, during his extensive ethnological research more than two decades ago, fostered the bold idea that the cultures of the Oceanians and the American Indians had perhaps grown from one common root. Boas, Jacobsen and Schurtz have taken up the idea; from other quarters he has been strongly opposed." In the course of his discussion Mahling (*Ibid.*, p. 20) writes: "We have seen that the Oceanian myths place the Earth-mother in near relation to the Heaven or to the Sun. We shall further see that the conception of Mother Earth also reappears among the American Indians. ... The Aztecs painted the Earth as a woman with numerous breasts and venerated her as their beloved mother. ... The Peruvians named the Earth *Mama alpa*... Mother Earth, from whose womb all life came..." Later (*Ibid.*, p. 54): "It has been shown that the creation myths of the Oceanians are closely related to those of the American Indians. Conceptions of the origin of the Earth with which we are already familiar in the one area reappear when we consider the other."

We shall here examine in further detail some parallels, especially between the religious beliefs of Peru and Polynesia, most of which have not entered into the broader American-Polynesian surveys of Mahling and his sources.

The period of night after the first creation

As could be expected, the primordial Polynesian conceptions, said to have been taught by the legendary god-men who arrived from the original Fatherland, dealt with the subject of how the Polynesians were first created by the true and supernatural gods. Ellis, Fornander, and other early visitors to the islands were struck by the similarities between the earliest Hebrew teachings as preserved in the opening part of the Old Testament, and the Polynesian accounts of the creation, deluge, etc. It has therefore often been suggested that these beliefs were imported by more or less direct migrations from the East Mediterranean and Arabian world. We find, however, that there is no need to go back to the Old Hebrew beliefs to find a prototype for these Polynesian conceptions; they were present also in aboriginal Peru, and in a form much more comparable to the Polynesian versions than is found anywhere among the Mediterranean cultures.

We know no details of the cosmogony and mythology of the culture people who abandoned the megalithic cult site of Tiahuanaco beyond what their own artistic reproductions may tell us, and nothing is known of their language apart from the fact that it was hardly Aymara and certainly not Quechua, which was introduced as a principal language in Peru only through the Inca domination. Yet we have seen that geographical and mythical names of pre-Inca origin have survived even through Inca generations, and since the Inca strove to associate their royal descent with the divine *Viracochas* of Titicaca Island and Tiahuanaco, we may well assume that some of the Tiahuanaco religious beliefs were incorporated also in Inca lore.

Both in Inca Peru and in Polynesia the first created things to materialize were respectively the sky and the earth. Then certain unfortunate humans were created, while the whole world was still left in oppressive darkness. (Rowe 1946, p. 315; Izett 1907, p. 27.) This period, when some unfortunate human beings dwelt in the ancestral land without sun or light, was throughout Polynesia referred to as the period of *Po* (*po*="night"). It is thus described by Izett in his *Maori Lore* (*Ibid.*): "It was night, dense, black, oppressive night! Throughout the Void Darkness reigned, as Darkness had reigned from the beginning, in countless ages of centuries far beyond the knowledge of either gods or men. In an obscure corner the children of Rangi (Heaven) and of Papa (Earth), cramped, cribbed, cabined, and confined, lay huddled." A long myth follows, showing how the children of Rangi and Papa consulted together and prayed and finally obtained light and sunshine.

We recall in this account the Inca assertion that the aboriginal people in their land lived in a period of darkness until Viracocha and his followers arrived and brought them light and sunshine. Betanzos wrote (see Part V above): "In ancient time, they say, the country and province of Peru was in darkness, having never light nor day. There were, at the time, certain people in it, which people had a certain chief who commanded them and to whom they were subjected. Of the name of the people and the chief who commanded them they have no recollection. And in those times, when all was night in this land, they say, that from a lake in this country of Peru, in the province of Collasuyo, there came a chief called Con Ticci Wiracocha who, they say, had with him a certain number of people, which number they do not recollect. And after he had sallied forth from this lake, he went from there to a site that is close to this lake, where to-day is a village called Tiahuanaco, in the aforesaid province of the Collao. And as he went thither, he and his own, forthwith there improvisedly, they say, that he made the sun and the day..." Cieza (1553-60, Part II, Chap. V) referred to the same Peruvian belief: "...before the rule of the Incas in these realms, and even before they were known, these Indians relate other things much older than all that has been told. They affirm that for a long time they were without seeing the sun, and that suffering a great deal on that account, they prayed and made vows to those of whom they looked as their gods, and begged them for the light which they needed. And while this was going on the sun rose in great splendour from the island of Titicaca, which is within the great lagoon of the Collao, so that all were delighted. And immediately after this event there came and stayed a white man of tall stature, who, in his appearance and person showed great authority and veneration, ..."

Before we proceed to consider the gods and events that follow the primeval period of *Po*, we may first consider the three mythical names already quoted, *Rangi* (Heaven), *Papa* (Earth), and *Po* (Night), which are daily terms in the Polynesian language and yet seem so closely associated with these myths of the earliest period.

The Maori term *rangi* reappears as *ani* in several other Polynesian dialects where the "r" is silent or dropped and where the Maori nasal "ng" always is a pure "n". Thus, in the Marquesas Group *ani* means "heaven", "sky", and also "Paradise". We cannot expect that this term should be retained in the unrelated Quechua speech of the Inca, but when we look for vestiges that might survive among the marginal tribes of the Tiahuanaco area, we find that exactly the same term *ani* reappears with the same meaning "heaven" in aboriginal East Bolivia, in the Paikoneka and Bauré languages of the Arawak east of Tiahuanaco. Créqui-Montfort and Rivet (1926, p. 112), who list the word there, do not point to its reappearance in Polynesia, but to its relationship to the word *hanego* and *hanigo* for "heaven" in the Pukina or Uru language of the primitive tribes in the Titicaca basin. This takes us right back to Titicaca Island and the nearest vicinity of Tiahuanaco.

The next of these Polynesian terms, *papa*, meaning "earth" or rather "surface of the earth", also appears in one of the Polynesian names for the Fatherland, *Papa-loa* (*loa*= "long", "extensive".) *Papa* is the only way any Polynesian dialect could render the well-known term *pampa*, used in South America for the large local plains. Markham's dictionary (1864) shows that the European languages have adopted this term *pampa* from the original Quechua language in Peru. Two of the great plains along the Pacific coast of Peru are known respectively as *Pampa Tambo* and *Pampa Tanga*. We may also note that the general Quechua term for the "earth" is *paca* or *pacha*, and that Rowe (1946, p. 295) gives the term *Paca-mama* or "Earth-Mother" as the Peruvian highland denomination for this mythical female progenitor so well known also from Polynesian mythology. The aboriginal Peruvian terms *pampa* and *paca* for "earth" concur remarkably with the Polynesian term *papa* with the same significance.

As to the Polynesian term *po*, "night", I have failed to find any direct vestiges in the southern Andes, but among the Cayapa Indians further north on the Pacific slopes of Ecuador we find that the "moon" is known as *pō pa''ta*, whereas the "sun" is *pa''ta*. (Barret, Vol. II, p. 353.) The "moon" is, in other words, referred to by the name of the "sun" only with the distinctive prefix *pō*, which we may then suspect to have some connection with "night". *Po* is also the term for "night" in the Sekumne language of California. (Bancroft 1875, Vol. III.)

Gods of the Tiki cyclus

When we continue the story of creation, we recall that out of the period of darkness in Peru there emerged one man-god, referred to in Inca times by the Quechua term Viracocha, or "Sea-Foam", but known in earlier times among his own highland subjects as Tici or Ticci. He and his followers, who in some beliefs seemed to have been descendants of the sun but in most others creators of this heavenly body, settled among the Uru tribes of the Titicaca basin, intermarried with the Uru women on Titicaca Island, and yet were considered in a peculiar way to represent *creators* of a new and happier form of mankind that arose upon their arrival, after the period of darkness. We have also found (Part V) the same name or title reappearing as *Tiki* or *Ti'i* over wide areas of Polynesia, associated with the creation myths from Easter Island to New Zealand. On nearly all these islands *Tiki* had the same confusing double significance as the creator of living things which appeared at the break of the period of darkness, and yet as no more than the first man—himself created in a supernatural way either by the "Earth" and "Heaven" or by the "Sun". Among the Moriori of the Chatham Islands Tiki was the offspring of Rangi and Papa (Heaven and Earth) and although he was the "maker of all things" he was still himself the first man. (Skinner 1923, p. 57.) On Easter Island Tiki was similarly the first man as well as the creator of all mankind. (Métraux 1940, p. 315.) In the Marquesas Tiki was the supreme creator of all living things, but on Rarotonga he was apparently only the first man. (Stolpe 1891, p. 206.) In Tahiti Ti'i (Tiki) was the first father of mankind, whereas he was himself born in a supernatural way as descendant of the sun and the moon. (Ellis 1829, Vol. I, p. 112.) We have seen that he was also known there under the full name *Maui-ti'i-ti'i-o-te-ra*, or "Maui-tiki-tiki-of-the-sun", his father being *Hibi-ra* or "Ray-of-sun". (Luomala 1940, p. 36.) Ellis (1829, Vol. I, p. 119) even writes: "...the legend of the origin of the Incas, bear no small resemblance to that of Tii, who was also descended from the sun." Buck (1938 a, p.245) shows that a similar confusion between the supernatural creator and the first man also occurs in one of the Hawaiian myths: "In the Kumulipo, Ki'i (Ti'i, Tiki) was born a man, and La'ila'i a woman in the eighth era, which ushered in the Day ending the long period of profound Night. ... Thus man was born before the gods, ..." Later, when also citing creation myths from the Marquesas, Mangareva, and Easter Island, Buck (1949, p. 452) derived to the final conclusion that in Polynesian mythology there seemed to exist confusion between the true pre-human creator-gods and what he termed "an interloper named Tiki." From New Zealand Phillipps (1945, p. 4) says with Best: "We have seen that Tiki is closely associated with the origin of man in the anthropogenic myths of the Maori. He is said by some authorities to have been the child of Rangi [Heaven], and is sometimes given as the parent of Uru. Either he possessed several names or there were several beings named Tiki, as Tiki-tirohia, Tiki-ahua, Tiki-apoa, Tiki-matua, Tiki-nui, Tiki-roa, etc."

That *Tiki* in Polynesia is given as the "parent" of the mythical progenitor *Uru* recalls that in early Peru *Tici* was venerated as the "creator" of the local *Uru* around Tiahuanaco. That *Uru* in Polynesian tradition was more than one mythical god is apparent from the fact already shown (Part V) that in other Polynesian traditions from widely separated groups *Uru* was memorized as a leading nation either living in or bordering on the ancestral seat of the creator Tiki. We may also briefly repeat that *Taranga* (also Caranga) was the name of another local Titicaca and Rio Desaguadero tribe and that *Taranga* (also: Karanga) is recalled in widespread Polynesian groups as another of the mythical progenitors in the Fatherland, generally the mother of Maui, whose full name is Maui-tiki-tiki. We have even found that the Polynesian mythical names and terms *Maui* and *Mauri* must have been known also on the Titicaca plateau in former times, since the principal tributary of the Rio Desaguadero near Tiahuanaco was of old known as *Mauri*, while *Mauri* and *Tambo-Mauri* are also the names of two native villages between Tiahuanaco and the Pacific coast.[1]

China—Hina, Sina

Weckler (1943, p. 26) gives another Tahitian version of Tiki, referring to his mythical marriage with the "mother" of all living beings. He writes: "In this version Ti'i was apparently formed from earth. He married the goddess Hina, daughter of two supernatural beings. The children of Ti'i and Hina intermarried in the primeval darkness with the gods of that time. The children produced by these matings became the ancestors of the high chiefs who were therefore entitled to wear the red feather girdles reserved for the use of the people of highest rank, but the children that were simply conjured up by these early supernaturals became the ancestors of the common people."[1]

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[1] Schmidt (1913, p. 1106) quotes Ehrenreich from South America regarding a Karaya sun-myth: "Most striking is its conformity to the Polynesian Maui-myths."

In Samoa Hina is pronounced Sina, and she is there remembered as the wife of Tangaroa and mother of Longo. (Gill 1876, p. 14.) Hina, or Sina, the "female", is remembered as the first woman in wide areas of Polynesia, and the wellknown Polynesian term *vahine*, "woman", is well derived from the same root. In the Quechua speech of historic Peru *china* is the general term for "female" in reference to all quadrupeds, as well as being the general Inca term for all maids and servant girls. (Garcilasso 1609, p. 197; Middendorf 1890, p. 351.)

The creation of man

The inconsistent claim in both Peru and Polynesia as to the existence of other unfortunate beings living in the period of darkness before the actual creation, makes it difficult to understand just at what stage the creation of the first real human ancestry was thought to have taken place. In Peru, the immigrant hierarch Tici was obviously a trifle late to create the *first* man, arriving among the local aborigines when the period of darkness broke, to carve the different local tribes in stone at Tiahuanaco. It was therefore often assumed in Peru that the creator had made man twice, before and after a man-destroying flood. Whereas the last creation was performed by Tici when he carved the human statues in stone, there seem to be references to an earlier and original creation at which the supreme god, in making the first men, had "modelled them in clay." (Joyce 1912, p. 150.) In Yucatan the Maya believed that the creator made the bone and flesh of the first man from earth, whereas his hair and beard were made from fine straw. (Mahling 1902, p. 23.) Similar beliefs to the effect that the first humans were made from earth or clay were found all over Polynesia. Ellis (1829, Vol. I, p. 114) wrote from early Tahiti: "One account states that the visible creation has two foundations or origins, that Taaroa [Tanga-roa] made the earth, the sun, moon, and stars, heaven and hell: and that Tii [Tiki] made man of the earth. ...Tii and Taaroa the people imagined to be one and the same being, but that Taaroa dwelt in the region of *chaos*, and Tii in the world of *light*." In the Chatham Islands Tiki, son of Rangi (Heaven) and Kopapa (Earth), maker of all things and himself the first god-man, made the first true human of earth. (Travers 1876, p. 26; Skinner 1923, p. 57.) In Huahine the first man was thought to have been formed from sand. (Schirren 1856, p. 65.) In the Marquesas he was thought to have been moulded by Tiki in clay. Buck (1949, p. 451) renders a Maori version according to which "the first man was made by Tiki from a mixture of his own blood and clay, and a variant...version says that the first man was made by Tikiahua out of red clay." The same authority (*Ibid.*, p. 450) also renders a Maori version where the gods form the first woman "out of the red earth at Kurawaka on the *puke* (*mons Veneris*) of the Earth-mother." Again, in Hawaii, the two creators Kane and Kanaloa made the first man of earth. (Bastian 1883, p. 225.) We have formerly noted (Part II) that the worship of one of these two Hawaiian creators, *Kane*, seems to have reached Polynesia with the secondary immigrants and is met with also among the Northwest Coast Indians. The name of the other, *Kanaloa*, is only the Hawaiian way of pronouncing the name of the Central Polynesian creator-god *Tanga-roa*, whom we have just found to be identical with—or another name for—*Tiki* in the two-phase creation myth of Tahiti. Fornander (1878, Vol. I, p. 98) also mentions a Hawaiian creation myth where "the body of the first man was made of red earth and the head of white clay." He says in another passage (*Ibid.*, p. 71): "...the Polynesian reference to the head of man being made of 'white clay', although a myth, may yet have a historical substratum, and indicate a lingering reminiscence of a mixed origin, in which the white element occupied a superior position."

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[1] See also Ellis (1829, Vol. I, p. 113).

According to Izett (1904, p. 22), the Polynesians remembered that the place where the man-god Tiki first created his fellow men was located at a place known to their ancestors as *Tapu-tai-roa*, or the "Great Sacred (or tabooed) Sea." We have seen that the early Peruvians also placed the creative activities of their Tici on the shore of the salty inland sea where he first appeared—Lake Titicaca. Spence (1913, p. 298) wrote: "At Lake Titicaca the Peruvians believed the inhabitants of the earth, animals as well as men, to have been fashioned by the creator, and the district was thus sacrosanct in their eyes."

This sacred lake of the Andes yielded an abundance of fish to the surrounding Indians, and Posnansky (1914) has identified one of the typical local species in the carvings of Tiahuanaco. As is well known, the water of Lake Titicaca is slightly brackish and was possibly more so formerly, since its fauna also include certain typical marine species, like the characteristic *Hippocampus*, or sea-horse, various *Allorchestes*, and a few other representatives of oceanic rather than fresh water fauna. Now, as we shall later see, Polynesian mythology has several references to a body of water, lake, or pond, lying inside their earliest Fatherland. According to a claim in one Hawaiian myth, quoted by Beckwith (1912, p. 305), it is said to be "lying within the land stocked with all kinds of fish of the sea except the whale and the shark." It is not very unlikely that this ancient myth is based on the memory of a sacred inland salt lake where the water contained quantities of big fish and even some small marine species otherwise absent from rivers or fresh water lakes. Apart from Titicaca there are indeed not many inland lakes in the territories around Polynesia, and none that contain marine species and are sacred and associated with human creation and with Tici myths. In the above tradition, the great homeland which is said to contain this lake is alluded to as *Paliuli*. This is translated by Fornander (1878, Vol. I, p. 77) as "Blue Mountain," and is again stated by him to be regarded as "a sacred, tabued land." An actual name for this sacred land and lake seems nearly always to be carefully omitted, but in the Easter Island dialect we meet the peculiar word *Titikaga*, which is used by the local natives simply as a superlative, meaning something truly "supreme" and "primary".[1]

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[1] *Titikaga* is translated by Churchill (1912, p. 260) as: "Power, authority, primacy, preeminence, supremacy, reason." *Titi* means also "landing-place" or "shore".

Tia—Atia

We have seen (Part V) that Tiahuanaco is a modern Quechua denomination for the ruins, and that *Chucara* was the original name for this pre-Inca cult-site in ancient times. We have also seen in Polynesian mythology that a god with the closely related name *Tutara* (i. e. *Kukara*) married the woman *Taranga* and produced the progenitor *Maui-tiki-tiki*, who led mankind into the ocean. No explanation has been given of the origin of the pre-Inca name *Chucara* for the Tiahuanaco site, beyond the already cited fact that, according to the Uru tribes in the vicinity, *Chucara* meant "House of the Sun". It may, however, be interesting to see that there has been much speculation as to the origin of the later Quechua designation, *Tiahuanaco*. The best known and most widely quoted origin of the name is based on a rather imaginative explanation first attempted by Garcilasso (1609). According to this theory, an Inca was once sitting among the ruins of Tiahuanaco, when a fleet-footed courier brought him a message from Cuzco. The Inca, in a complimentary comparison of the messenger's speed with that of the wild species of llama, the *guanaco*, thus addressed the courier: "*Tiay Guanaco*! (Be seated, Guanaco!)" Thus the ruins acquired the name *Tiahuanaco*. As Verrill (1929, p. 261) has clearly shown: "This explanation of the origin of the name is far-fetched and unreasonable. In the first place, the guanaco is not found in Bolivia, but is a native of Southern Chile, and the Inca would have been far more likely to have compared his messenger to the vicuña, with which he was familiar, than to the guanaco. Moreover, the word guanaco is of Mapuche and not Quichua derivation, while finally, guanaco has the accent on the penultimate syllable, whereas huánaco has the first syllable accented." Apart from all this, it is difficult to see why these gigantic, venerated old ruins should have been named merely because some visiting runner was asked to be seated, and it is quite apparent that the peculiar name gave rise to the explanation rather than that the reverse was the case.

Verrill (*Ibid.*) seems to have a far better explanation, at least of the latter part of the name. He agrees that Tiahuanaco, or as it is as frequently written, Tiahuanacu, is a composite name, but shows that the latter part, *huánacu*, is a Hualla (ancient Quechua) word meaning "dead". To the Inca the ruined site of Tiahuanaco was a place of the dead, or a dead city. He says: "The name was undoubtedly bestowed by the Incans, just as the ruins of Chavín were so called owing to the fact that they were the work of past or dead persons, *chawi* meaning literally 'a body that has lost its life (density)' and which, in its broader sense, is used for remains of any kind. The use of the word *huánacu* or its roots or derivations, as applied to anything devoid of life or pertaining to dead persons, was common among the Incans. ... the burial-ground was called Huánacu-Pampa, etc."[1] We are thus left with the first syllable *Tia*, which Verrill does not make any clear attempt to explain. The present Indians, it would seem, had adopted the term the "Dead *Tia*," or the "Ruins of *Tia*," for the site which, according to their own statements, had been abandoned long before the Incas were known. It would therefore seem as if *Tia* was another name of this early site of creation before it was left in ruins on Tici's departure into the Pacific.

When we now return to the creation myths of Polynesia, we find in a Tahitian version that Tiki (Ti'i), the descendant of the sun and maker of man, "formed the woman of earth at *Atiauru.*" (Weckler 1943, p. 12; also Ellis 1829, Vol. I, p. 114.) That this is a composite name, *Atia-uru*, or "*Atia* of the *Uru*," is clear, since both *Atia* and *Uru* are names connected with the primary abode of ancestor gods in the legends of widespread parts of Polynesia. Since the "Ruins of Tia," or Tiahuanaco, are in the midst of *Uru* lands, it may be taken as a working hypothesis that *Tia* and *Atia* refer to one and the same site, particularly since both are memorized as the place where Tiki, respectively Tici, created the first men. Smith (1910 a, p. 123) renders the following old legend of this abode as preserved among the Maori: "Over this land of *Atia-te-Varinga-nui* [Atia-of-the-great-Varinga] there ruled in very ancient days [about 450 B. C. according to the genealogies!] a king or ruling chief named Tu-te-Rangi-Marama who is accredited with building a temple twelve fathoms high, which he enclosed with a stone wall, and named it a '*Koro-Tuatini*,' or place of many enclosures. It was built as a meeting place for gods and men; and here the spirits of the ancient after death foregathered with the gods. It was a *Ngai Tapu Kaka*, 'a sacred glorious place,' of great space within, and filled with many beautiful and wonderful things." Smith adds: "What the great temple built by Tu-te-Rangi-Marama was, I am quite unable to indicate, but that it was something quite out of the common is obvious..."

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[1] The root Huanaco appears as a separate place-name in Peru, at 10° S. One of the most sacred ancestral gods of the Incas was spoken of as *Huanacauri*. (Markham 1873, p. xi.)

When we consider this legend and the mythical names it includes, *Atia*, *Varinga*, *Tu*, *Rangi*, and *Marama*, we may make a few interesting observations. Firstly, as to *Atia-te-Varinga-nui*, or "Atia of the great Varinga," we find *Atia* to be the place and great *Varinga* probably its possessor, whether it be a king or a people. We have suggested that the memories of this abandoned *Atia*, or *Atia-Uru* (where the Polynesian Tiki-of-the-Sun first made mankind) and the name of the actual Andean ruins of *Tia* (in the midst of Uru land, where the Andean sun-god Tici performed the very same deed) may refer to one and the same ancient and abandoned creation centre. The group of colossal enclosures and ruins south of Lake Titicaca must have been just such a cult-site as is described in the Polynesian legend, where "the spirits of the ancient after death foregathered with the gods." As Posnansky (1914, p. 54) wrote in his monograph on the ruins: "Tiahuanaco was not only a centre of cult and culture, but also a burial-place and site for worship of the dead." When Polynesians speak of an ancestral temple twelve fathoms (about 70 feet) high and enclosed by a stone wall, they speak of a compact or pyramidal structure, as they knew of no other lofty form of temple, owing to their ignorance of cement and the principles of the arch. All things considered, there are not many Polynesian-type temples corresponding to this description in the territory bordering on the Pacific; the pyramids of the Sun and the Moon on the North Peruvian coast, and the abandoned creation-centre of Tia (huanaco) near Lake Titicaca, are about the only ones that could be suggested. Remains of an extensive stone wall that formerly enclosed the colossal Akapana pyramid are shown by Stübel and Uhle (1892) in their plan of the Tiahuanaco ruins, and in Part VI we have discussed the large and the smaller *marae*-like stone enclosures left at the base of this lofty, formerly stone-faced pyramid.

Considering next the legendary names associated with the memories of this Atia-of-the-great-Varinga, we recognize (from Part V) in *Varinga* the earlier discussed root that reappears in speech straight across Polynesia from Easter Island to New Zealand and Fiji, (*hiringa*, *taringa*, *faasinga-tapu*, *inga*, *inga-nui*, *singa*) associated with the sun, long-ears, priests, departed spirits, and bleached persons. The same root was widespread in Peru, where it originated with the long-eared children of the Sun from Lake Titicaca (*Inga-ré, Inga, Inca, ringrim*).

Arama—Marama

The name of the ruler who built the lofty temple and enclosures at *Atia* was *Tu-te-Rangi-Marama*. We have already considered the term *rangi* (heaven), and may interprete the name of the early hero as "Marama, the Sacred of the Heaven." *Marama*, however, was not only a mythical name of this sacred ruler at Atia, but was in itself a common Polynesian term appearing in the dialects of the various groups with the meaning "light", "daylight", "brightness", "brilliance", and occasionally even as the term for "moon". This is interesting, for in the same part of Bolivia east of Tiahuanaco where the Bauré and Paikoneka tribes used the Polynesian term *ani* as their word for "heaven", the Mojo aborigines worship the mythical *Arama* as their "God of Light", who parched the soil with his glaring eye. (Brinton 1882, p. 150.) It is not impossible that there once was a common Andean origin for the mythical *Arama*—the Mojo Indian "God of Light"—and the mythical *Marama*—the Polynesian ancestor-god whose complete name was "The Sacred Light of the Heaven", and who built the great temple at Tiki's place of creation—*Atia*. The Mojo territory is so close to Tiahuanaco that even the Incas, from their capital much further north in the Andes, followed the river from near Tiahuanaco into Mojo territory. (See Part VIII.)

Ku—Ku

We have now found *Atia*, *Varinga*, *Rangi*, and *Marama*—that is, nearly all the names from the legend under discussion—surviving with related forms and meanings among living Bolivian tribes in the Tiahuanaco latitude of the Andes. Remaining from the same legend is the term *Tu*—in Polynesia, as we have seen, a prefix or suffix commonly attached to legendary names of a very sacred nature, but at the same time a personal name for one of the principal gods of Polynesia. This god, referred to as *Ku* in the Hawaiian dialect, is, as we shall see later, claimed in this northern group to be but another name for the supreme god Kane, *alias* Rongo. This seems to be the case also on Rarotonga. (Best 1924 b, p. 109.) On Mangareva the same deity appears as the supreme god, identified with Atea-Tangaroa (*Ibid.*, p. 110), but at Niue he was only considered a secondary ancestor-god who was "said to be an albino." (*Ibid.*) In New Zealand and Samoa, *Tu* was above all the god of war, in some Maori myths even identified with the supreme god who created Tiki. (*Ibid.*, p. 230.)

If we turn to the circum-Pacific area in search of this pan-Polynesian ancestor-god *Tu* or *Ku*, we find that observers pass right through Indonesia and South Asia to point to what they consider a unique analogy in the myths of antipodal Egypt and Assyria. Best (*Ibid.*, pp. 58, 109, 110) and many with him compare this Polynesian *Tu* or *Ku* with the Assyrian "god of death" *Tu*, or the Egyptian "setting sun" *Tum*. We need not go so far as that. Due east of Polynesia, we may first of all note that *Ku* is the name, title, or suffix of the principal Maya god. In fact Thomas (1898, p. 104) pointed out, as already briefly mentioned, that the Polynesian term *Ku* reappears with an identical meaning in the Maya word "*Ku*, a deity; holy, divine." In Morley's *The Ancient Maya* (1946, p. 213) we read of the local cosmogeny: "The creator of the world, according to ancient Maya belief, was a god named Hunab, or Hunab Ku, who was the father of Itzamna, . . ." We have earlier seen that Itzamna was the earliest immigrant Maya "wanderer" and hierarch. Morley (*Ibid.*) also shows that an early chronicler claimed that the name of this god means "one only God." He adds: "Indeed Hunab Ku means precisely that in Maya: *hun*, 'one,' *ab*, 'the state of being' and *ku*, 'god.' This creator-god, however, was so far above ordinary mortals, so remote from everyday affairs, that he seems to have figured but very little in the everyday life of the common people." Brinton (1882, p. 161) too mentions *Ku* as the word for "god" and "divinity" among the Maya.

We may venture to trace possible vestiges of the same Maya-Polynesian deity further down in South America, and we recall from Part V that *Tume*, *Zume*, and *Xue* was a name associated with the supreme wandering god who had brought religion and culture to widely separated peoples in South America. We even found that in the Titicaca basin *Tupaca* or *Tu-paca* was one of the names for the early local white wanderer, *paca* meaning, as we have recently seen, "earth" or "world", a root also used elsewhere in the composite names of the Peruvian creator. In Polynesia *Kopapa*, or *Ko-papa*, was, as we also have seen, the Moriori name for the sacred earth in its personified form as supreme progenitor of all created things. Brinton (1882, p. 174) writes of the pre-Inca Viracocha: "Another of his frequent appellations for which no explanation has been offered, was *Tokay* or *Tocapo*, properly *Tukupay*. . . .Melchior Hernandez, one of the earliest writers, whose works are now lost, but who is quoted in the *Relacion Anónima*, gives this name *Tocapu*; . . ." Some other names for Viracocha, like *Tunupa* and *Tonapa*, are also composed of *Tu* or *To* with a varying suffix. *Tocapu* or *Tukapu* would in Polynesian dialects directly mean "*Tu* the tabooed", or "Sacred *Tu*".

Tambo—Tambu

The possibility that former Peruvians actually once used a term equivalent to the present Polynesian *kapu* (Hawaii), *tapu* (Central Polynesian and New Zealand), *tabu* (Tonga), or *tambu* (Fiji) at the time when *To-capu* was thought of as a name for their wandering creator, is not improbable. In fact this has been suggested by several earlier writers. Lately Degener (1949, p. 195) wrote: "As Seemann suggested, there may be a philological connection between the word *tambu* used by the Andean Indians for the houses 'set apart' for strangers, and the Fijian word *tambu* meaning 'set apart' or taboo. The Fijians, similarly to the Indians of the Andes, had guest houses, or *mbure-ni-sa* in Fijian, where strangers had the right to pass the night and obtain food and drink." We mentioned earlier that Tambo-Mauri is a village, while Tambo is both a river and a large plain between Titicaca and the Pacific coast. The old Peruvian word *tambo* meets us again in connection with the earliest legendary appearance of the *Incas*. Bandelier (1910, p. 316) quotes Acosta, who first related that the Incas were supposed to have descended from Viracocha after he had originally come from Titicaca to make his abode in Tiahuanaco, and afterwards passed on to Cuzco. Then Acosta adds: "Others say that out of a certain cave, through the window, there came six or I do not know how many men, and that these made the beginning of the propagation of mankind, and this was at what (the place which), for that reason, they call Pacari Tambo. So they are of the opinion that the Tambos are the oldest lineage of mankind. From there, they say, proceeded Mangocapa, whom they recognize as the founder and head of the Ingas. ... he came out of a cave or window of Tambo, which is five or six leagues from Cuzco."

Rowe (1946, p. 316, brackets by Rowe) correspondingly writes: "*The origin of the Inca.* —About 18 miles (30 km) southeast of Cuzco in the modern province of Paruro is a place (*Paqari-tampo*, 'origin tambo') where there is a hill (*Tampo-t'oqo*, 'tambo hole'), in which are three small caves. ... From the side caves emerged the ancestors of several of the *Inca* ayllus, and the founders of the *Inca* royal family came out of the middle one." *Tambo* or *tambu* was accordingly a living word in the Cuzco area at the time when the first Incas made their mystical appearance among the pre-Inca highland tribes, and we may judge that the significance of the word must have been similar to that of the Pacific islands, since it was used in such connections as "origin tambo" and "tambo hole" with reference to the sacred or tabooed places where the divine Incas had first emerged.

Culture-hero striking with a path-finding rod

The first appearance of Manco Capac and the true Incas at "origin tambo" took place only a few centuries before the arrival of the Spaniards, and accordingly *after* the supposed spread of Andean peoples into the Pacific. Therefore, we do not find this *Pacari tambo* legend and subsequent Inca events preserved in Polynesian memories, which seem to be focused instead around the pre-Inca Tici or Tiahuanaco myths. There seems, of some strange reason, to be one exception. We recall with Garcilasso the well-known Inca myth of how Manco Capac, the first Inca, had learnt from his father, the sun, that when he proceeded to search for a favourable site to choose as his future abode, he should strike a golden rod against the ground before him wherever he went, and when the rod sank into the ground he should end his wanderings and settle down. We have mentioned that this procedure might either have been copied after the earlier Viracocha who introduced agriculture and created irrigation in live rock, or else Viracocha's original behaviour might have been accredited Manco Capac in the purposeful Inca attempts of making their own brief lineage begin the cultural history of the Andes—an attempt which has been made futile through the findings of modern archælogy and even through the stubbornly persistant Tici-Viracocha myths. We have seen earlier (Part V) that even the name of the earliest Inca was borrowed from one of the countless names for the earlier Mango-Ynga-Zapalla *alias* Tu-Paca *alias* Tici. The Peruvian idea of a migrating culture institutor who is guided in his search for a favourable new settlement by striking the soil with a rod to see how deep it sank, has very likely originated among primitive local tribes who first saw immigrant agriculturists selecting their abode according to the depth and quality of the soil, and whether or not the myth began with the one or the other of the Peruvian high-cultures it is interesting to note that a somewhat similar myth has survived in Polynesia.

According to Beckwith's Kepelino traditions (1932, p. 70), a Hawaiian legend tells how, before the Polynesian ancestors left the homeland, there was a younger brother of Kanaloa, named Kane-apua, who was a great priest of the god Kane (*alias* Ku, *alias* Lono, according to the same authority; *Ibid.*, p. 68). Kanaloa and Kane-apua where actually men, but they "were called gods, because the people regarded them as gods because of the number of miracles they performed." Kane-apua, who wandered about the original land with a rod, was apparently more than a high priest, he was also king or chief; and on command from his god he led the people on long wanderings through lands inhabited by foreign tribes. We learn from the legend that when Kane-apua's god "wanted his race of people to go to the land that Kane [the Sun-god] gave to the race," he ordered the high priest Kane-apua to lead the people on the migration in company with his older brother Kanaloa. The wanderings took the two brothers and Kane's own race to a district named *Kona* (well-known place-name both in Hawaii and in the Titicaca basin), where they were oppressed by the local chief who was very evil. Kane-Apua consulted with his god, and the latter told him to lead his people away. The great priest-king now assembled his race and told them that it was a command from God that they were to go away to another land. But the evil local chief only abused him and wanted him to prove that the order had really come from his god. The god now became angry. "He withdrew the rain, and famine came upon the land. After that the chief let the people go and they went. The common people went as far as the beach, there they met with trouble because the evil chief sought them with wicked intent." While the common people were thus assembled in suffering on the foreign coast, they wept and were angry with Kane-apua and Kanaloa who had got them into this trouble. In the meantime Kane-apua, who wandered about the land with his rod, prayed to his god for guidance. The god answered: "Smite a pathway." The wandering Kane-apua then began his magic song:

"Strike away, strike gently,
Strike where? strike gently,
Strike seaward, strike gently."

When he came to the seacoast, his god similarly ordered: "Smite your rod on the surface of the water." Kane-apua obeyed, and he and his followers were enabled to "walk" on the water as if it were on dry land, and thus he and his race escaped across the sea. Kane-apua now chanted:

"Strike away, strike gently,
Strike where? strike gently,
Strike landward, strike gently."

Thus, to judge from the legend, did the great priest by means of his path-finding rod lead his people to their new abode on the islands in the Pacific Ocean.

The original land where Kane-apua began the migrations that finally brought the Polynesian ancestry down to the ocean coast must apparently have been a desert country where water was scarce. For the legend tells us that, when the ancestral migrants were suffering greatly from thirst, then "Kane-apua thrust at the stone twice with his staff and water flowed." This ability of making water flow from live rock was another ability he shared with the migrant Tici-Viracocha of the Peruvian myths. (See p. 254.) Also the belief that the wandering priest-king had his god *withdraw the rain to let famine come upon the land* before he himself departed from the coast by walking on the water, are elements closely following the Con-myths on the Pacific coast of Peru. (Cfr. legend on p. 308 above.) Con, *alias* Tici, did exactly the same thing to punish the local people before he and his followers in a corresponding manner left for good on their migration into the Pacific.

Kane, Kana, Kan—Kane, Kan, Kin, Kon

In Part II we found in the Northwest Indian mythology that the Kwakiutl culture-hero, progenitor, and sun-god Kane-Akwea, had originally settled locally as an alien immigrant, but later, upon marrying a woman of the sea, he departed into the open Pacific. He reappears as Tane, Kane, or Kane-Akea, a principal progenitor and god among widely separated Maori-Polynesian tribes. The Hawaiians consider Kane their principal and original god, and the local sun-god. He looses somewhat in importance on the other islands, where Tanga-roa, *alias* Kana-loa, was usually considered the more important god—commonly the ocean god—but on Mangaia also the sun-god and father of the fair island race. It was this same god who brought Vaka-akau-uli, or "Steersman-of-log-craft" and his family of "white-skinned" seafarers to uninhabited Tonga. According to the legend just cited, Kanaloa is in a Hawaiian legend described as a real human and an elder brother of Kane-apua, the priest-king who led man from the continental homeland out across the ocean. Whoever he is, the etymology of his name is interesting. The ending *loa* (in other local dialects *roa*) is a very familiar Polynesian augmentative suffix to personal or geographical names, e. g. *Wahie-loa*, *Hawaii-loa*, etc. Thus Kanaloa means simply Kana-the-Great, or Great-Kana. Now, *kana* (also *kana-kana*) is a Polynesian term for "bright" and "light," and *Kana-loa* can be translated as the "Great Light" or "Great Brightness," a poetic name or title that makes us recall what Christian (1924 a, p. 535) once pointed out. He wrote: "Maori *kanakana*, to be bright. This word is found practically all over Polynesia. ... In Peruvian we find Aymara *kanakana*, shining, brilliant. Inca *ccana*, *kana*, to set on fire; *kancha*, the light; *kon*, fire, the sun. In Micronesia we find the root *kong*, blazing, and *keni*, to light a fire."

Thus inside aboriginal Peru we find the local words *kana* and *kon* to be mutually related, and we recall that Kon (i. e. Con, *alias* Tici) was the principal lowland appellation for the Peruvian solar representative and culture institutor who withheld the rain before he himself departed by sea with his followers. With the identity both in form and meaning of the Polynesian and Peruvian words *kana* and *kana-kana*—and with a probable relationship between *kana* and *Kana-loa*, both of Polynesia, and *kana* and *Kon*, both of Peru—there seems to be more than a casual resemblance between the great creator Con who lead his white and bearded race away from the Pacific coast of South America and the great creator Kana who brought the same type of people to Polynesia, where he became the legendary progenitor of the light-coloured *uru-kehu* strain, the fair offspring of Kana-loa. Just as the Peruvians identified Con with Tici, so did the Tahitians identify Kanaloa with Tiki[1] and state that they were "one and the same being."

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[1] In Tahitian dialect: Ta'aroa and Ti'i.

In Polynesian dialects the word for "man", *kanaka*, *tangata*, or *ta'ata*, has probably the same root as the name for this great god Kana-loa, Tanga-roa, or Ta'a-roa. And Ellis (1829, Vol. I, p. 334) pointed out more than a century ago: "...though but little light is thus thrown on the origin of the people, it is interesting to trace the correspondence between the *taata* or *tangata*, first man, in Polvnesia, and *tangatanga*, a principal deity among the South Americans; ..." We have also mentioned that Pampa Tanga, or Tanga's plains, is the name of a large section of the coastal lowlands in Peru. Tangalongo was the name of a great Chilean chief at the time of Tupac Incas conquest of the southern Andes. (Garcilasso 1609, Bk. 7, Ch. XIV.)

Kane and Kanaloa (i. e. Tane and Tangaroa) are generally considered to be two competing creator-gods, the worship of which have entered Polynesia at different times and possibly along different routes. Through comparison with New World mythology we have here found that the worship of the Great Kana or the Great Tanga seems to have followed the worship of Con or Tangatanga from early South America—just as the rest of the memories of the gods and god-men of the Tiki cycle—while the worship of Kane later reached Polynesia from the Northwest Coast by way of Hawaii.

Now the roots of these mythical god-names in Polynesia, *Kane* and *Kana*, are in themselves so much alike as to warrant suspicion of a further source relationship. As we have seen, several earlier writers have suggested that the art and speech of the Northwest Coast Indians indicate some slight influence from the early high-culture centres of Mexico or Central America. We have touched on the possibility that the Kwakiutl culture-hero and sun-god Kane may embody the memory of some early religious teacher from the high-culture centres of the American continent further south.[1] On the same time we have given special attention to the much more evident possibility that ancient Peru was reached by a daughter-culture with primary roots among the Central American high-cultures. If this hypothesis is correct, then the two Polynesian deities Kane and Kana(-loa) may be the results of inspirations that emanated, along different routes and at different periods, from one original Middle American centre. And in fact, in his study of *American Hero-Myths*, Brinton (1882, pp. 152, 153) shows that the first day of the Maya week was named *Kan*, after the first Maya culture-hero Itzamna (son of Hunab Ku) who was also known by the "surname" *Kanil*. *Kan*, which is otherwise also the Maya term for "serpent," their symbol for the sun or the sun-rays, is part also of the name of the second Maya culture-hero, *Kukul-kan*, the "Plumed Serpent," the bearded culture-hero who finally left Yucatan on his Central American wanderings. To the Maya, this term *Kan* is also associated with the direction "east" and the colour "yellow" (Morley 1946, cover map), and evidently also with the Maya term "*Kin*, the sun, the day" (Brinton, loc. cit. p. 158). We learn from Brinton (*Ibid.*, pp. 153, 158) that Itzamna was not only known as *Kanil*, which was the determinative form of *Kan*, but: "His next most frequent title was *Kin-ich-Ahau*, which may be translated either, 'Lord of the Sun's Face', or 'The Lord, the Eye of the Day'." The important Maya term *Kan*, the name of their first culture-hero *Kanil*, and their word for sun and day *Kin*, may well form the missing links between the Kwakiutl sun-god

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[1] It is interesting to note that this immigrant Kwakiutl god had "killed the double-headed serpent to have it for his belt" (Boas 1935, Pt. I, pp. 1, 7), and that he used the sling (*Ibid.*, p. 2), typical elements of the high-cultures to the south.

Kane and *Kani* and the Peruvian sun-god *Kon* with the local term for "shining", *kanakana.*[1]

The difficulty the mixed Polynesians tribes had in distinguishing between their various gods, titles of gods, and deified ancestors is quite apparent, and is one of the reasons why foreigners find it so hard to realize that at bottom the Polynesians in most groups were more monotheistic than their language might seem to indicate. An old Marquesan chief, Tei Tetua, the only survivor of the formerly rich population on the isolated east coast of Fatuhiva, strove very hard to make this clear to me. He had willingly adopted Christianity, but still firmly believed in the mythology which had come down to him from his own stock through oral traditions and sacred songs for untold generations. When I asked him how he could believe in *both* religions he answered very wisely: "Your people and mine speak different languages, but the meaning is the same. You say Jehovah, we say Tiki. He is the same. You say Adam and Eve, we say Atea and Atanoa; they are the same."

The Hawaiian Kepelino traditions, published by Beckwith (1932, p. 68), says of the three supreme gods of Hawaii, *Kane*, *Ku*, and *Lono*: "Kane was originally the only god of Hawaii; there was no other god, only Kane. This is how the one god came to be called Ku and Lono,—here is the true account of these names. Ku is Kane, Lono is Kane. Ku is not a different god, neither is Lono a different god. They were Kane, and they were Kane's own names. They were what Kane, the god, was called in the chants. ... But Kanaloa was not a god, he was a servant of Kane. ... He was a high priest for Kane, and Kane-apua was his younger brother." It may be difficult to judge to what extent this monotheistic conception is inspired from modern Christianity, as suggested by Buck (1949, p. 528), but it is quite clear that the Polynesians themselves, in their respective groups, had obvious difficulties in being consequent in specifying between the ranks of the supreme gods Tane (Kane), Tu (Ku), Tangaroa (Kanaloa), Rongo (Lono), and Tiki (Ki'i). Through comparison with the names and titles for the supreme god (and his earthly representative) among the early American high-cultures, we may be led to suspect that what was originally an essentially monotheistic idea with variety of names alluding to the same supreme creator-god, did later stagnate in mere words to take the form with which we meet it in Polynesia.

We have not, as in the other cases, found Rongo to reappear as an alternative name for the pre-Inca creator-god, nor have we met with the memory of this deity anywhere else outside Polynesia. Yet the name may very well have been known in Peru in pre-Inca days, since its structure is preserved as a personal name in Inca Peru. One of the legendary Inca generals was named Otorongo (Pachacuti 1620, p. 291), and we have just mentioned that a great Chilean chief was named Tangalongo. Corongo is a place-name in Peru south of Cajamarca.

Ahau—Hau, Auhau

To return to the early Maya names or titles for the primary culture-hero *Itzamna*, *Canil*, or *Kin-ich-Ahau*, we may next turn our attention to the suffix *ahau*, translated above by Brinton as "lord," and representing the common title of the supreme ruler governing each Maya state. As Morley (1946, p. 161) writes "...*ahau*, a word the sixteenth-century Maya manuscript dictionaries define as 'king, emperor, monarch, prince, or great lord.'"

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[1] In Guatemala the word for "Heaven" is *Hura-kan*. (*Ibid.*, p. 211.) In the Cuna speech of Panama *kana* means "skilled". (Nordenskiöld 1928, p. 9.)

In turning to Polynesia again, it is noteworthy that the word *hau* was the old Hawaiian title for "king" or "supreme chief". *Auhau* means to "rule" and "hahau" to "whip," "chastise". In the Tuamotus the same term *hau* means both "to govern" and "kingdom," while on Easter Island *aho* means to reign. On Mangareva and Rarotonga *au* means "rule" or "government", and in Tahiti *hau* reappears with the same meaning as in the Tuamotus. In Tonga *hau* was the title of the ruling hierarch, and the same word reappears in Samoa as *sau*, and also in Futuna and Fiji as *sau*, a "king" or "chief". The fact that the Polynesians on all their widespread islands copied the people of the early American Maya empire by using almost the identic title for "king" or "supreme chief," has been pointed out by Stucken (1927) in his comparative list of ancient American and Polynesian words. Furthermore, while describing the megalithic ruins of Ponape in the east of the Carolines (see Part VI), Christian, cited by Enock (1912, p. 285), wrote: "In the inner terraced enclosure lies the great central vault or treasure-chamber identified with the name of an ancient monarch known as *Chau-te-reul* or *Chau-te-leur*. *Chau* was the ancient Ponape word denoting (a) the sun, (b) a king. The latter signification tallies with the Rotuma *Sau*, a king, and the Polynesian *Hau* and *Au*, a king, chief. ... It is perhaps worthy of mention that the word *chau*, Ponape for sun, might seem to have some analogy with *Pun-chou*, meaning sun—in the Quechua language of Peru..." The identification of the king with the sun is also an interesting comparative element.[1]

Camax, Zamal, Kama—Tama

Returning once more to Itzamna, the first and principal Maya culture-hero and son of the supreme god Hunab Ku, we may note with Brinton (1882, p. 157) that the name *Itzamna* itself is considered by some to be composite and built over the main root *zamal*, "morning," "morrow," or *zamalzam*, "dawn," "aurora." We seem to recognize this root *zamal* in the name of the Aztec god *Camax* (tli), the mythical father of the first Aztec culture-hero and wanderer Quetzalcoatl.[2] (*Ibid.*, p. 90.) The roots *Zamal* and *Camax* turn up again in Peru in a related form; we have already shown that one of the principal alternative names for Tici-Viracocha, used over large stretches of the coast, was *Pacha-Camac* and Pacha-*Cama*. *Pacha*, as we have seen, meant "earth" and "world," and was used also in the composite name *Tu-Pacha* for the same mythical earth-father and progenitor. Middendorf's Quechua dictionary (1890) translates *Pacha-Cama* thus: "The creator and master of the world, name of the principal god among the ancient Peruvians."

Thus we are left with the following series: *Zamal*, or "Morning," was among the Maya the probable root in the name of their earliest wandering man-god Itzamna; *Kamax*, or *Camax* (tli), was among the Aztecs the *father* of their earliest wandering man-god Quetzalcoatl; and, again, *Kamak* or *Kama* (*Camac*, *Cama*) was among the Inca the name of the earliest wandering man-god to arrive in Peru. *Zamal*, *Kamax*, and *Kama* all seem to embody either some linguistic or some mythical relationship to the heavenly light. The Peruvian *Kama* was, as we have seen earlier, like its synonym Viracocha, directly associated with the sun. Furthermore Gusinde (1928, p. 690) shows from South America that one of the Arawak tribes has a legend of two brothers who were apparently creators or general culture-heroes, one of them, representing the sun, was named *Kame*. Also Crequi-Montfort and Rivet (1926, p. 114) mention that *Kame* is the sun in certain Arawak tongues.

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[1] Fornander (1878) shows that in Hawaii the title *hau*, for the local high chiefs survived from the earliest island ear. Speaking of the pan-Polynesian migratory period and disturbances at the opening of the present millennium, he writes: "At this period commences the development of the idea of a sovereign lord or king, *ka-moi*, over each of the principal islands of the group. ... after this period the word *moi* appears in the legends and Meles [songs]... I am inclined to think that the oldest Hawaiian designation of the highest rank of chiefs was *hau*, which word meets us with nearly the same meaning in the Samoan and Fidjian *sau*, the Tongan and Tahitian *hau*, the Rarotongan and Mangarewa *au*, the New Zealand *whaka-hau*.."

[2] As is well known, in Aztec pronunciation the sounds *tl* and *tli* are added as a favourite ending to names and words.

Taking a starting-point into the Pacific from the great solar earth-father Pacha-*Cama* of lowland Peru, we know that *Cama* in some Polynesian dialects would be pronounced unchanged as *Kama* (e. g. Hawaii); in others, where the 'k' was pronounced 't', as *Tama* (e. g. New Zealand). Tregear (1909, p. 131) quotes a myth from New Zealand, describing how Maui had once noosed the sun and begun to beat that deity with an enchanted weapon. The text goes on: "The sun screamed out, 'Why am I smitten by you? oh man! do you know what you are doing? Why should you wish to kill *Tama nui te Ra*?' Thus was learnt his [the sun's] second name. So, before this, the sun was evidently known as *Ra*, afterwards as 'the great *Tama*, the *Ra*'." Since *ra* is the Maori term for sun, the name of the smitten solar god *Tama nui te Ra* may be directly translated as "the great *Tama*, the Sun." Best (1922, p. 12) states: "The personal name for the sun, *Tama-Nui te Ra*, was in common usage in former days..." Further (*Ibid.*, p. 13): "Another name for the sun is Tama-Uawhiti..." According to Maori tradition, *Tama* as a personal name for the sun or the sun-god must be very old and imported into the islands from the original homeland. For we have seen (Part I) from an earlier Maori tradition that when the earliest ancestors left the continental homeland to seek a new home across the ocean, their leader said: "*Me whai tatou i a Tama nui te ra.*" Literally: "Let us follow the great *Tama*, the sun." Best (quoted by Gatty 1943) also renders the following strophe from an old Maori song: "The sun sags down on *Tama's* path across the changing sky..."

In his *Polynesian Religion*, Handy (1927, p. 36) shows that *Tama* was regarded by the natives of the Chatham Islands as a god with life-giving powers. He also writes (*Ibid.*): "... I shall quote a spell which the Moriori of Chatham Islands employed for the purpose of reviving a fainting person:

"'Tis the life (*mauri*)
'Tis the sensation (*anini*)
'Tis the light breath (or quivering)
Of Tama, the Great-child-of-the-sun,
Of Tama, the only child,
Of Tama, the offspring of heaven."

The fact that the same mythical name had a wider distribution on the islands in former times appears from the following observation by St. Johnston (1921) in the Fiji group. He mentions a "custom of respect that is used in Fiji to high chiefs, and has sometimes in similar fashion been—quite improperly—applied by the natives to senior white officials. That is the low long-drawn cry of '*Tama*', literally 'Father' that is respectfully emitted by any little knot of people when the chief passes by. He is the real descendant of their Sky-father—for it is obviously a Polynesian-originated custom—and is therefore thus saluted; but the curious thing is that it is considered quite wrong to give the '*Tama*' after sunset. This has not been hitherto explained, but my reading of it is that after sunset the sungod—or his representative—is not supposed to be present at all, is hypothetically absent and invisible, so that it would be obviously wrong to recognize his presence."

Ra—Ra

We have noted that *Tama* has survived in New Zealand as a rudimentary term, or rather a *personal name*, for the sun, whereas *ra* (also *raa*, *la*) is the general Maori-Polynesian denomination for that same heavenly body. Handy (1927, p. 106) writes: "It is said that the sun was venerated in New Zealand as a god named Ra, but evidently this deity was accorded little if any actual worship. In Mangaia, Ra was the sun god in mythology as in New Zealand, and the same is true of La, called usually Tangaloa La, in Samoa. Only in the Society Islands does Ra or Raa, seem to have had an actual cult. There he was appealed to in prayer and temples were built in his honor, and he had a considerable amount of prestige as a war god." The fact that the same word is connected with the sun and sun-god also in ancient Egypt and Babylonia (Best 1923 b, p. 15), has been rendered the strong point in all the theories of Polynesian origins in the Eastern Mediterranean. It has been regularly repeated in the arguments of the group of extreme diffusionists, without much regard for geography. I doubt whether the concurrence of a similar name in any other two antipodal hemispheres would be regarded as affording conclusive proof of direct circum-global contact.

We have seen in Part II that while *Kane-Akn'ea* was the sun-god of the Northwest American Kwakiutl, *na-la* was their name for "the sun," while *lah* was also the word for "sun" in the Kulanapo (Pomo) language of northwestern California. And with *la* meaning "sun" on the nearest islands down-stream — Hawaii — we find a direct importation of the term into Polynesia from Egypt less convincing, and quite unnecessary. If Egypt is involved, America is at least there to form a practicable stepping-stone.

Surviving languages give no direct reason for suspecting that the term *ra* or *la* for the "sun" was used in former Mexico. But the case seems to be somewhat different regarding aboriginal Peru. We have seen (Part V), with the native Peruvian chronicler Pachacuti (1620), that one of the many names for Viracocha was *Uiracocha-ra-pacha*. We have repeatedly dealt with the names *Uiracocha* (sea-foam) and *Pacha* (earth) which in themselves, or in composite forms (Tici-Viracocha, Tu-pacha, etc.), are names for the supreme god behind the Tiahuanaco cult. We are left, then, with *Ra* as one more name for the same god—distinct from the others in the composite name of *Uiracocha-ra-pacha*, irrespective of whether we divide it up as *Ra-Pacha* or *Viracocha-Ra*.

We may also note that *Raymi* or *Raimi* was among the Inca the name of the principal solar festival of the year. (Middendorf 1890.) *Capac Raymi* was the name of the month when the December solstice was celebrated, and *Inti Raymi* the month when the June solstice was celebrated with a great festival in honour of the sun. (Rowe 1946, p. 310.) *Ras'pi* means "twilight", "dawn" in Quechua, and *rauray* "to burn". (Compare *ra-ura*, "red sun" or "east" in New Zealand; Middendorf 1890; Best 1924 b, p. 59.) Furthermore Markham (1911, p. 230) writes of the natives in the Huarochiri province of central Peru: "These people, who spoke a dialect of Quechua, preserved a tradition, handed down to them from the megalithic age, of the supreme god of Pirua, the 'Uira-cocha'. To his name they attached the words 'Cconi-Rayac', meaning 'appertaining to heat'. They addressed him as 'Ccoñi-rayac Uiracocha'..." As we have already seen (Part V), the early chronicler Avila also recorded that the Peruvians worshipped a god *Coni-raya*, suffixed *Uiracocha*. The fact that the sun-god *Con* also carried the names *Ra* and *Raya*, with *Raymi* as the solar festival, may perhaps make a plausible case for the former usage of a root *Ra* with solar significance in Peru also.

Tula, Kolla—Kura, Tula

We do not find the term *ra* or *la* in Aztec or Maya religious concepts, but we do find in ancient Mexico that the term *Tula* is of the greatest importance in the local mythology, as a reference either to the abode of the sun, or to the original land from which the culture-heroes came. (Brinton 1882, pp. 82-86, 139, 164.) As we know that Tu meant "god", "sacred", and "divine" to the Maya, as also in Polynesia, it is not perhaps inconceivable that the solar significance of the term is founded in a composite origin such as *Tu-la*, "divine sun".

Tula, from which came the names *Tollan* and *Toltec*, used by the Aztecs to describe respectively the legendary home and the race of their fair predecessors, was intimately associated with the Quetzalcoatl myths.[1] Under the heading "*Quetzalcoatl, the Hero of Tula*", Brinton (*Ibid.*, p. 82) writes: "But it was not Quetzalcoatl the god, the mysterious creator of the visible world, on whom the thoughts of the Aztec race delighted to dwell, but on Quetzalcoatl, high priest in the glorious city of Tollan (Tula), the teacher of the arts, the wise lawgiver, the virtuous prince, the master builder and the merciful judge. ... this Tollan, where Quetzalcoatl reigned, is not by any means, as some have supposed, the little town of Tula, still alive, a dozen leagues or so northwest from the city of Mexico; ... nor, indeed, anywhere upon this weary world; but it was, as the name denotes, and as the native historian Tezozomoc long since translated it, where the bright sun lives, and where the god of light forever rules so long as that orb is in the sky." Further (*Ibid.*, p. 84): "It is worth while to examine the whereabouts and character of this marvellous city of Tollan somewhat closely, for it is a place that we hear of in the oldest myths and legends of many and different races. Not only the Aztecs, but the Mayas of Yucatan and the Kiches and Cakchiquels of Guatemala bewailed, in woful songs, the loss to them of that beautiful land, and counted its destruction as a common starting point in their annals. ... *The Books of Chilan Balam*, of the Mayas, the *Record from Tecpan Atitlan*, of the Cakchiquels, and the *Popol vuh*, National Book, of the Kiches, have much to say about Tulan." Further still (*Ibid.*, p. 164): "Again, one of the Maya chroniclers—that translated by Pio

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[1] Brinton (*Ibid.*, p. 86) writes: "The natives of the city of Tula were called, from its name, the *Tolteca*, which simply means 'those who dwell in Tollan'."

Perez and published by Stephens in his *Travels in Yucatan*—opens with a distinct reference to *Tula* and *Nonoal*, names inseparable from the [Aztec] Quetzalcoatl myth." Also (*Ibid.*, p. 85): "The most venerable traditions of the Maya race claimed for them a migration from 'Tollan in Zuyva.' 'Thence came we forth together,' says the Kiche myth, 'there was the common parent of our race, . . .' " Finally (*Ibid.*, p. 86): "Montezuma, when he heard of the arrival of the Spaniards, exclaimed, 'It is Quetzalcoatl, returned from Tula.' "

Throughout his description and discussion of this important Mayan and Aztec place of divine origin, Brinton (*Ibid.*, pp. 82-86, 139, 164) strives to identify the term with the mythical place of light, the home of the sun. In Peru the Inca do not seem to have preserved this word as a correspondingly sacred place-name in their own myths. The reason for this may perhaps be that some of the Incas' principal enemies had already monopolized the name, or at least a closely related form, to describe their own old abode in the Titicaca basin. We recall that early Spanish chroniclers refer to Lake Titicaca as "a lake in the *Collao*". We may add that the territory to the north of the lake is called *Kollau*. Here are the pre-Inca ruins of Pukara, where the only immigrant survivors from the deluge presumably had first camped, being later perpetuated in stone statues by Viracocha in memory of this event. (See Part V.) Valcárcel (1935, p. 25) shows that the real name for this territory of *Kollau* is actually "*Kolla-wa*", the "land of the Kolla". The territory of the proper Kolla-people is today joined on the south by the *Uru* land around the shores of Lake Titicaca, and on the north by the *Kana* territory south of Cuzco.[1] The *Kana* people, we recall (from Part VI), intended to stone Tici-Viracocha when he passed through en route from Tiahuanaco to Cuzco and the Pacific coast, but they recognized his divine power and built him a bearded statue later found by the Spaniards to resemble St. Bartholomew.

The importance of the Colla in the former Titicaca basin is quite apparent. Referring to the secondary Inca introduction of the Quechua language in the Andes, Means (1920 a, p. xxv) claims that "the language of the earlier period in the mountains was Colla." In its wider sense *Colla* is used to describe the *Aymara* people occupying the whole Titicaca area, including most of the Bolivian plateau and the southern highlands of Peru. The prehistoric demarcation lines between the Colla (or Aymara) language and the Uru (or Puquina) tongue is not quite clear, as both seem to have varied in extent and importance over large areas in the Peru-Bolivian highlands around Tiahuanaco. Many archæologists, who consider Tiahuanaco to have been built by local mountain Indians without influence or inspiration from outside, credit this cult-site and the entire pre-Inca flowering of culture at Titicaca entirely to the work of the *Colla*. (E. g. Rydén 1949.) The fact that the term Colla was already in widespread use as an important pre-Inca name, applied particularly to the early occupied Andean territory around Pucara, would not encourage the later Inca to reverence the term to the same extent as the Aztec, Maya and their neighbours reverenced *Tula* and *Tollan*, the home of their early ancestor-gods.

But when we now turn across the Pacific, we find this same old American term spread all over Polynesia, from *Tula* in Samoa to *Kura* in Easter Island, from *Ula* in Hawaii to *Ura* in Tahiti and *Kura* in New Zealand. Everywhere the word appears with the primary significance "red", "golden", "light", or "light-beam". In the Marquesas the fair branch of the local ancestors were specially referred to as *Kura*, a term often applied to the ruddy colour of sun-burned Europeans in Polynesia. *Kura* or *Tula* is often associated also with the east; thus an extreme eastern cape in Samoa is termed *Mata-Tula*, "Eyes of *Tula*", or "Facing *Tula*". But in parts of Polynesia there is much more significance in this particular word. Hammond (1924, p. 211) shows that to the Maori this term has an "intensely sacred character". He writes: "Whenever the term '*Kura*' occurs in the structure of a word, or in the name of a place, it usually indicates a sacred derivation. ... One reason for the absence of the word—in its sacred sense—from any Maori lexicon, is the fact that it is one of the basic words in the fabric of Maori superstitions, and could not be discussed or even named except under sacred conditions."[1]

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[1] See "Tribal and Linguistic Distributions of South America", in Steward 1950, Map. 18.

The extent and limitation of the sun-worship

When we review the Andean Con-Tici-Viracocha myths we find that the ancient Peruvian solar religion cannot justly be referred to as pure sun-worship. In fact, the claim has been raised in some quarters (Means 1920 a, p. 27; etc.) that only the Incas were the actual spreaders of the genuine sun-cult in Peru, the pre-Inca religion having been essentially an ancestor-cult focused above all around a creator-god. We have seen, however, that this creator-god under his various names is intimately associated with the appearance of the light and the sun, and that some of his pre-Inca names are related to the terms for these conceptions. The relationship between the creator-god and the sun is also apparent from numerous Tiahuanaco works of art, not least the central figure on the monolithic Gateway of the Sun. Evidently in later Inca time the sun itself was raised to a much greater importance, but even then not as the sole supreme deity. Rowe (1946, pp. 293, 294) gives us the following basic structure of the Inca religion:

"*The Creator.*—The greatest god was the Creator, a being without beginning or end, who created all the other supernational beings, animals, and men, and ruled them very much as the *Inca* Emperor ruled his Empire. ... Viracocha, the Creator, was the theoretical source of all divine power, but the Indians believed that He had turned over the administration of his creation to a multitude of assistant supernatural beings, whose influence on human affairs was consequently more immediate. He lived in the heavens, and appeared to men at crises. He was also a culture hero, as it was believed that after the creation He had journeyed through the country teaching people how to live and performing miracles. He finally reached Manta (in Ecuador), and set off across the Pacific Ocean walking on the water. *The Sun.*—The most important servants of the Creator were the sky gods, headed by the Sun, who was believed to be the divine ancestor of the Inca dynasty. ... Although a very important power in *Inca* religion, the Sun was merely one of many great powers recognized in official worship, and his importance was more theoretical than real."

The seemingly paradoxical fact that the Inca religion also was basically monotheistic in spite of a vivid belief in secondary astral and other elementary gods, ancestor-gods, and a number of super-naturals, recall what we found inside Polynesia.[1]

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[1] We may repeat that in New Zealand *ra-ura* or "red-" or "golden-sun" is one of the terms for "east", and that in Peru (Quechua) *rauray* means "to burn"; and add here that *ura* is the Tahitian word for a "flame" or a "glow". It is also interesting that the term *kura*, with the significance "golden" and "shining", was applied by some Polynesian tribes to "metal" when first confronted with this substance among Europeans. The Inca term for "gold" was *kori*. (Middendorf 1890.)

The argument is occasionally raised by Pacific anthropologists that the Polynesians were not actual sun-worshippers in the way the *Incas* were. This is true, but the very same statement is equally often made by Americanists when the *pre-Inca* religion is compared to that of Inca time. Although the continental pre-Inca and the early settlers of Polynesia were less genuine sun-worshippers than the subsequent Peruvians in Inca time, the religious importance attributed to the sun, and especially to the sun's human personification, and man's descent from light, cannot quite be overlooked.

To look first at the Inca mode of worship, we may note that Benzoni (1565, p. 247), who has a better reputation for his technical drawings (Plate LIX **5**) than for his ability to penetrate the Inca mind, wrote in early historic times: "Although these people hold communication with the devil, they reverence the sun as their principal deity. When either the chiefs or the priests wish to ask some favour of him, they go in the morning at sunrise to the top of a flight of stone steps made on purpose, holding their heads down, clapping their hands, then rubbing them, then raising them as if they wished to touch him, repeating some of their prayers and asking for what they want of him."

On the nearest island down the current analogous hand-motions accompanied the same type of prayers when the European discoverers arrived. We have seen that Behrens and Roggeween wrote about the early Easter Islanders: "In the early morning we looked out and could see from some distance that they had prostrated themselves *towards the rising sun* and had kindled some hundreds of fires, which probably betokened a morning oblation to their gods." And "...we noticed only that they kindle fire in front of certain remarkably tall figures they set up; and, thereafter squatting on their heels *with heads bowed down, they bring the palms of their hands together and alternately raise and lower them.*" (Italics by T. H.)

When Routledge (1919, p. 223) later collected the clan names on Easter Island, she found most to be solar, like: "Sun," "Sun-rise," "Red of Sun-down," "Rainbow," and "Light".

Rudiments of former beliefs in a solar descent have already been cited from many of the Polynesian islands. We have in this respect seen how Ellis (1829, Vol. I, p. 112) compared the Tahitian solar origin of Tiki (Ti'i) with that of Manco Capac in Inca Peru, not being aware that the pre-Inca progenitor of Manco Capac himself was called Tici. Henry also (1928, p. 409), in rendering the Tahitian myth on the "Birth of the Demigods," shows that the great divine progenitor of Tahitian royal lines spoke of himself as "Maui-ti'i-ti'i, son of the Sun". In another old Tahitian myth the sun itself is also referred to as the father of Maui-ti'i-ti'i. (*Ibid.*, p. 431.) We recall that the latter was the ancestor, and mythical fisherman, generally famed for his original 'catch' of Polynesia.

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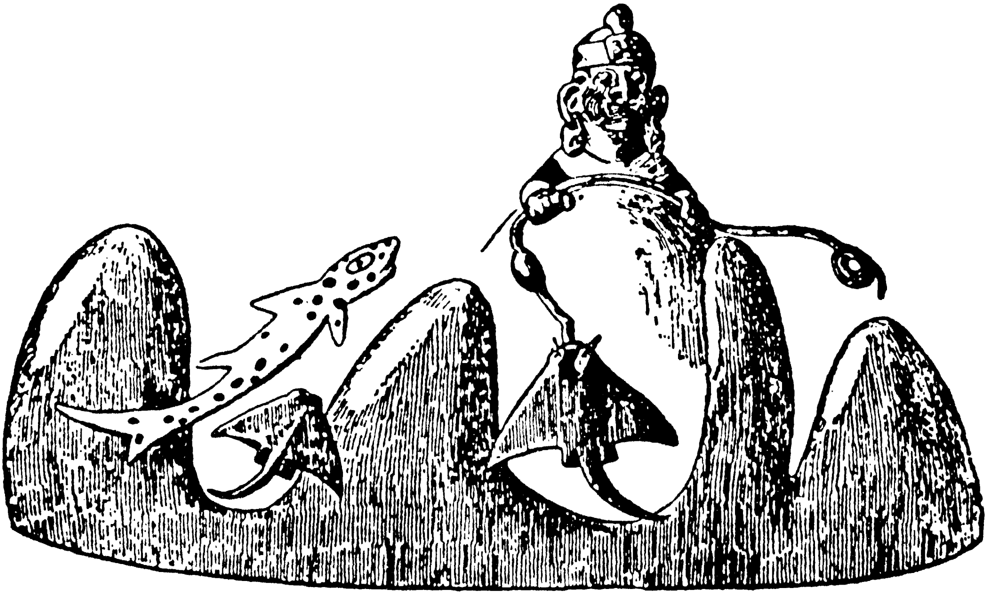
[1] Means (1931, pp. 437–439) has translated a number of the original Inca prayers and songs collected by the early chroniclers, including the following one recorded by Molina: "O conquering Viracocha! Ever-present Viracocha! Thou who art without equal upon the earth! Thou who art from the beginnings of the world until its end! Thou gavest life and valour to men, saying, 'Let this be a man.' And to the woman, saying, 'Let this be a woman.' Thou madest them and gavest them being. Watch over them, that they may live in health and in peace. Thou who art in the highest heavens, And among the clouds of the tempest, Grant them long life. And accept this our sacrifice, O Creator."



Mythical fishing scene in iconographic art from the Chimu territory, North Peru. (From Leicht 1944.)

Fornander (1878, Vol. I, p. 44) quotes a Tahitian legend which says that Hiro, the first king of the Society island Raiatea, was the great grandson of Raa, the sun. He adds that on the island of Tupai in the same group "the sun was worshipped under the name of La or Raa," and a *marae* was dedicated to him. On Borabora the god Raa was a secondary deity. (*Ibid.*) We have just seen that in Mangaia and New Zealand too, Ra was a sun-god in mythology, and so also in Samoa, where the name appears as Tangaloa La. (Handy 1927, p. 106.) Fornander has also shown us that in the Hawaiian group the major god Tane (Kane) was identifiable with the sun. As Best (1924 b, p. 57) states: "This writer also clearly shows that the Hawaiians knew Tane as representing the sun, and adds that offerings were made to him. ... Fornander believed, however, that this sun-worship had faded away prior to the entry of the Polynesians into the Pacific area, or nearly so." To this Best (*Ibid.*) supplies the following argument concerning New Zealand. "There is abundance of evidence that Tane represents light, and that his name of Tane-te-waiora represents him as the source of the sunlight, which is the welfare of all things." In his monograph on *Maori Religion and Mythology*, Best (*Ibid.*, p. 59) ends his discussion on Tane by saying: "We now see why it is that the Maori has been said by many writers to have had no conception of a sun deity, that he practised no form of sun-worship, that he showed no reverence for that important luminary. It is because he personified the sun in Tane; because he discarded, in this connection, the ordinary word denoting the sun, *ra*, and elevated it to a high place in the Maori pantheon under a different name."

Contrary to Buck (1949, p. 508), who claims that "stronger proof is necessary" to warrant the claim that Tane in New Zealand had any connection with the sun such as Kane in

Hawaii, Best argues (1923 b, p. 15): "Such writers enlarge on the absence of evidence of a sun cult in Polynesia and New Zealand, whereas both regions teem with such evidence." The native Maori Hare Hongi (1920, p. 26) writes in his paper on "The Gods of Maori Worship": "To us on this sublunary sphere, Tāne is a most important member of these Sons of Light; for the symbol of Tāne is the Sun, our Sun. Tāne is essentially our Lord of the Year."

The correct interpretation is probably that rendered by Handy (1927, p. 103) in his *Polynesian Religion*, under the caption "Tane, God of Light and Male Vivifier." He writes: "Tane may have been 'the personified form of the sun' as Best puts it, or it may be said that the sun was a symbol of the god, as Hongi has it, but Polynesian religion was not a 'sun cult'."

Best (1922, p. 13) also says of New Zealand: "In one old myth the name of Hiringa is applied to the sun in connection with the singular belief that the sun represents knowledge—the higher kinds of knowledge." Further (1923 c, p. 118): "An old East Coast Maori once remarked to the writer that the West Coast natives could not possibly possess so much knowledge as those of the eastern side of the island because they were further from the sun."[1]

The Tahitian reference to Maui-Ti'i-Ti'i's father as *Hihi-ra*, "Ray-of-the-sun" (Luomala 1940, p. 36), reminds us of the following statement by Hongi (1918, p. 162): "...the Maori taught that solar rays piercing the warm [mother-]earth brought forth the man—Tane-Tiki..." This belief in a solar origin of the first man is also born out by the old Maori saying, collected by White and quoted by Best (1922, p. 13): "Proceed; here indeed is our ancestor, the Manu-i-te-ra (a personal name of the sun), standing above."

It is interesting to note that Schirren (1856, pp. 156-168) nearly a century ago analysed the earliest New Zealand traditions dealing with the migrations that preceded the arrival of the Maori fleet from Hawaiki. He came to the strange conclusion that they were all allegories, because they referred to westward migrations with the sun, and accordingly had no historic value in tracing Polynesian migrations, as they were apparently based on an earlier sun cult!

Among the Morioris of the Chatham Islands also there were distinct vestiges of a former sun-worship and belief in solar descent. Their principal gods are given by Skinner (1923, p. 50) as "Wai-o-rangi, father of the Universe, and Tami-te-ra, the sun-god," and we have seen earlier how the first Europeans to arrive were confused with messengers from the sun; also how the attendant of a dying Moriori "held the head of the dying man in the hollow of his arm, and, pointing to the sun, spoke as follows: Ascend direct above to the beams of the sun, to the rays of the morning, ...to the source, to the sun,..."

Rivers (1915, p. 431) and Best (1924 b, p. 59) quote Gill on the traces of an ancient 'solar cult' in Mangaia in the Cook Islands. Here again both Tane and Tangaroa, the father of the local fair-heads, seem to have been identified with the sun. In fact Gill (1876,

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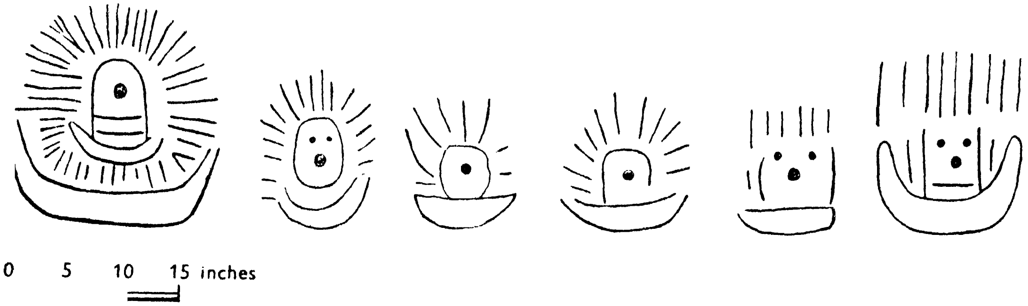
[1] We recall that the Maori schools were called *Whare-Kura* "House of Light" and they were built to face the sun. "Their studies commenced at the rising of the sun, and ended when the sun reached its zenith." (St. Johnston 1921, p. 85.)



Petroglyphs from the Society Islands, probably representing the personified Sun voyaging in a moon-shaped vessel. (From Emory 1933.) Compare figures on page 589 and page 758.

p. 13) quotes the following strophe from a sacred Mangaian chant, referring to the light-haired natives on the island:

> "The fair-haired children of Tangaroa
> Doubtless sprung from dazzling light."

From Pukapuka in the same group Beaglehole (1938, p. 311) speaks of a god, Kanitaka, who controlled the sun and was supposed to live there.

Grimble (1931, p. 206) speaks of traces of sun-worship in the Gilbert Islands, as seen for instance in the *kauti* ritual which was performed on great-stone platforms at dawn while facing the sunrise. Stair (1895 a) writes, rendering a Tokelau (Union Group) tradition, that these islands "would seem to have been peopled from some source where the inhabitants had been accustomed to offer human sacrifices to the sun, or else that they themselves did so at that time." Means (1931, p. 432) states of Peru that according to local traditions it had been common, prior to the rise of the Incas to power, to offer human sacrifices to the sun. (Cfr. also page 697, ft.n.)

In conclusion we may state that a moderate former sun-worship—consisting essentially in a belief in an original human descent from a solar progenitor—can be traced here and there throughout Polynesia, although the modern Maori-Polynesians have generally transferred the veneration for the sun to the creator-god or to the ancestral men-gods who were the sun's earthly representatives. This was precisely the nature and extent of the sun-worship in ancient Peru also, although in the recent Inca period the actual worship of the sun itself assumed an importance greatly exceeding that of the former period of the Con and Tici worship.

The deluge story

Early myths and religious conceptions in widespread areas of Polynesia include references to a man-destroying flood, in which, for some reason or other, the world was submerged by the sea. (Handy 1927, p. 15.) This event is attributed to the earliest period of human existence, before the commencement of local genealogies and actual Polynesian history, and in its construction and entire content it is readily distinguishable from the traditional accounts of locally experienced tidal waves, such as are well known, e. g. from the Tuamotu Islands. (Danielsson 1951, p. 112; etc.)

Ellis (1829, Vol. I, p. 386) wrote: "Traditions of the deluge, the most important event in reference to the external structure and appearance of our globe that has occurred since its creation, have been found to exist among the natives of the South Sea Islands, from the earliest period of their history. ... In one group the accounts state, that in ancient times Taaroa, the principal god, (according to their mythology, the creator of the world), being angry with men on account of their disobedience to his will, overturned the world into the sea, when the earth sunk in the waters, ..." The same author compares the aboriginal version of the Raiatean, Tahitian, and Hawaiian deluge stories, and although embodied in different allegories, he finds in all that "the inundation is ascribed to the rising of the waters of the sea. In each account, the anger of the god is considered as the cause of the inundation of the world, and the destruction of its inhabitants."

Turner (1861, p. 249) found a few traces of the deluge story also in Samoa, but none as elaborate as those of the Society Islands. Also the Maoris held belief in a great flood which occurred in the early mythical period, and was referred to as *Paraw'henuamea*. According to the Maori myth already cited from White (1889, Vol. I, p. 173), this great flood was sent by Tane to punish men because they had forgotten to worship him. Nearly all mankind perished, but the world was repeopled by a few who escaped on a raft (*moki*). We have already quoted the description of how the survivors, at the source of the River Tohinga in the homeland, had built themselves a wide log-raft of light-timbered wood lashed together with lianas and ropes, and covered with a house full of food, fern-root, *kumara*, and dogs. (See Part VIII.) As Beckwith (1932, pp. 34-36) shows, the Hawaiians have a similar version, according to which the god Kane got jealous because his people led a wicked life, and so he punished mankind through a world-destroying flood. Some survivors who boarded a large craft which was "like a chief's house", escaped to the human creation-centre of *Kalan'a Kahiki* in the ancestral Fatherland, "where man lived again." Fornander (1878, Vol. I, p. 88) also deals with the Hawaiian flood myths, and adds: "In many of the Polynesian groups, there still exist legends of a flood in which the majority of mankind perished, while only a few escaped." He shows that in the Hawaiian group there are several versions of the flood--*Kai-a-Kahinalii*—one approaching nearly to the Marquesas Island "Chant of the Deluge"—*te-tai-toko*, others indicating corruption of the original legend in a similar manner to the Fiji and Raiatea versions of the same myth. Whereas the Hawaiians speak of "a large vessel with a house on top of it", which after the deluge carried the new progenitor of mankind to safety in "a large and extensive country", the Marquesan account lets a few people survive to repopulate the earth by building a "big, deep house of wood", that stood above the waters as the ocean overflowed and destroyed the dry earth.

The basic similarity of the Polynesian deluge stories to the Hebrew and Chaldean versions was naturally taken by Fornander as further support of his theory of Polynesian origins in Southern Arabia. Yet he admits that the Polynesian versions are not derived either from the Hebrew or Chaldean accounts, nor from the Arian legends, but he suggests a missing link in some now lost traditions on the subject among "the Cushite-pre-Joklanite Arabs". Several early missionaries on the islands, including Ellis (1829, Vol. I, p. 393) was struck by the same conformity between their own Mosaic account of the deluge and the man-destroying water in Polynesian mythology, and in consequence they turned to the Old World in the hope of finding a migration route that could have conveyed the deluge story out of the antipodal Asia Minor. But Ellis was at the same time sufficiently familiar with the New World mythology to realize that corresponding accounts were widespread there too. He therefore adds (*Ibid.*, p. 394): "the safety which the progenitors of the Peruvian race are said to have found in caves, or the summits of the mountains, when the waters overflowed the land, bears a resemblance to the Tahitian; and that of the Mexican, in which Coxcox, or Tezpi, and his wife were preserved in a bark, corresponds with the Hawaiian tradition."[1]

Joyce (1912, p. 167) writes: "A tradition of a great deluge seems to have existed throughout the highlands of Peru, as in Colombia. Most of the legends place it prior to the coming of Uiracocha..." We may add that the deluge story seems to have been even more important in the Andean area than in Polynesia. Molina (1570-84) wrote of the Incas: "... they had a full account of the deluge. They say that all people and all created things perished in it, inasmuch as the water rose above the highest mountains in the world." We have seen with the same chronicler (Part V) that the only survivers saved their lives in a wooden "box", and that on the order of the Creator-god they settled as *mitimas* (colonists) in "Tia Huanaco".

Gamboa (1572, p. 29) was told by the early Incas that, as punishment by Viracocha for their sins, the first men on earth were destroyed: "...some were swallowed up by the earth, others by the sea, and over all there came a general flood which they call *uñu pachacuti*, which means 'water that overturns the land'. They say that it rained 60 days and nights, that it drowned all created things, and that there alone remained some vestiges of those who were turned into stones, as a memorial of the event, and as an example to posterity, in the edifices of Pucara, which is 60 leagues from Cuzco. Some of the nations, besides the Cuzcos, also say that a few were saved from this flood to leave descendants for a future age. Each nation has its special fable which is told by its people, of how their first ancestors were saved from the waters of the deluge."

Andagoya (1541-46, p. 67), Zarate (1555, Ch. X), Avila (1608, pp. 132-134), Pachacuti (1620, pp. 5, 8), and several other early chroniclers dwell upon the various Peruvian versions of the deluge. The latter narrated—as in the aforesaid version from Tahiti—that some Peruvian ancestors sought refuge in caves and hills. At the time of local discovery, Andagoya (*loc. cit.*, p. 14) also narrated a flood myth from the Panama Isthmus, according to which some few people escaped in a canoe to re-people the world. To the north of Panama the deluge story is equally widespread among the aboriginal nations, particularly among the early Mexicans, who associated it with their ancient myths of the lost home of the gods in the distant easterly ocean. Prescott (1847, p. 106) draws a parallel between this Mexican deluge story and that of Inca Peru, and again, Mahling (1902, p. 75) compares both of them unitedly with those preserved in Polynesian mythology. His conclusion is: "The deluge myths of the Indians agree fundamentally with those of the Oceanians. They diverge only in insignificant points."

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[1] The text gives "Hawaiian" in the place of "Tahitian" and *vice versa*, but this is an obvious misprint, as may be judged from his previous pages.

The sacred water of the Sun-god

The belief in a beneficent effect of the sprinkling or use of certain sacred water was intimately associated with Polynesian religion. Fornander (1878, Vol. I, p. 116) writes: "The use of these holy waters was of the highest antiquity, and universal throughout Polynesia. ... A custom so universal, so deep-rooted, must have existed previous to the arrival of the Polynesians in the Pacific." The latter supposition is also supported by Polynesian traditions, which insist that a sacred fountain, made by or belonging to the Sun-god, existed in the land whence their ancestors arrived. Thus the same author (*Ibid.*, p. 78) writes: "The *Aina wai Akua a Kane*, or, as it is more generally called in the legends, *Aina wai-ola a Kane*, 'the living water of Kane,' is frequently referred to in the Hawaiian folk-lore. According to traditions this spring of life, or living water, was a running stream or overflowing spring, attached to or enclosed in a pond. 'It was beautifully transparent and clear. Its banks were splendid. It had three outlets; one for Ku, one for Kane, and one for Lono, and through these outlets the fish entered into the pond. If the fish of the pond were thrown on the ground or into the fire, they did not die; and if a man had been killed and was afterwards sprinkled over with this water, he did soon come to life again." Further, with reference to the Samoan memory of the Fatherland: "In this ancestral home of *Pulo-tu* the Samoans also located that famous spring, or 'life-giving water', *Wai-ola*, which was such a prominent element in the ancient creed of all the Polynesians."

Fornander found no Malay counterpart to this venerated Polynesian fountain of the Sun-god—with its spring and pond of crystal-clear, beneficent water—and the myth again leads him to the distant Chaldeans and their belief in a post-mortem "water of life". But he adds as a marked distinction (*Ibid.*, p. 79): "The Chaldeans placed their waters of life in the realm of the dead; the Polynesians placed theirs in paradise."

If our identification of the Polynesian paradise is correct, it concurs with Tici's venerated centre of creation in the Titicaca basin, and the fountain should be a local pre-Inca conception or religious shrine.

We know from early Spanish accounts that the Inca Peruvians, at the time when the Europeans arrived, believed in the magical power of certain sacred water which was kept in special bowls and fonts for religious ceremonies. Among the shattered ruins of Tiahuanaco are some megaliths distinctly carved as ceremonial fonts, presumably intended for a similar religious purpose. Illustrating one stone-container about twelve feet square, carved in masterly fashion, Inwards (1884, p. 29) writes: "In favour of its being a font is the following passage from Salcomayhua [Pachacuti], in which he even gives the name of the stone used for the purpose of a kind of baptism. 'It is said that the Ynca sent men to search for the place called Titicaca where the great Tonapa [the bearded pre-Inca creator] had arrived, and that they brought water thence to pour over the infant Ynca Ruca, while they celebrated the praises of Tonapa. In the spring on the top of the rocks the water was in a basin called *ccapaccama quispisutuc unu* (words signifying rich-joy-crystal drops-water). Future Yncas caused this water to be brought in a bowl called *curi-ccacca* (Golden Rock), and placed before them in the middle of the Square of Cuzco called *Huacay Pata Cusi-pata*, where they did honour to the water that had been touched by Tonapa."

Spence (1913, p. 270) writes from the same legendary birth-place of the sun: "The most sacred of the Peruvian shrines, however, was Titicaca, an island on the lake of that name. ... On Titicaca there are the ruins of an extensive palace which commands a splendid view of the surrounding barren country. A great bath or tank is situated half-way down a long range of terraces supported by cut stone masonry, and the pool, 40 feet long by 10, and 5 feet deep, has similar walls on three sides. Below this tank the water is made to irrigate terrace after terrace until it falls into the lake."

There were hardly two such springs enclosed in baths or basins on the dry and rocky Titicaca Island, and we may assume that the above-described pre-Inca ruins represent the vestiges of the bearded Tonapa's sacred spring, with the basin referred to by the Inca as "rich-joy-crystal drops-water". And since the Incas sent messengers who had to cover 300 miles each way to bring sacred water to Cuzco from Tonapa's spring on Titicaca Island—a pilgrimage that continued through Inca times, centuries after the Titicaca and Tiahuanaco culture had died out—one may well assume that the Tiahuanacans in their days made a similar pilgrimage for the short distance from their settlement to the island. The more so since the island culture and that of Tiahuanaco were closely associated, and since the island palace and tank were constructed and in actual use in Tiahuanaco times.

Thus, as far as we can judge from archæology and Inca history, there was on Titicaca Island a venerated shrine in the form of a spring, enclosed in a pond and touched by the bearded creator-god himself, in the very place where he had first created the sun and the moon and let them ascend into the sky. Until historic times the Peruvians reverenced this particular spring, and had sacred water from its basin transported all the way to Cuzco. The Inca referred to it as *Ccapacchama Quispisutuc Unu*, "rich-joy-crystal drops-water", where the last term, *Unu*, means "water". This is interesting, since the Easter Island word for water is also *unu*.

Best (1923 c, p. 106) writes: "In W. D. Westervelt's 'Legends of Old Honolulu' is one entitled 'The Water of Life of Kane,' in which it is shown that the bulk of the Hawaiian folk believed Ka Wai ola a Kane to be real waters that existed in the form of a lake situated in some far off land." As Best (*Ibid.*) like Fornander, shows, they even had a distinct legend to the effect that this land was to the east of Polynesia. One of the early forefathers wanted to sail in search of this ancestral water. "In order to obtain it, he was instructed to proceed straight to the rising sun." Thrum (1929, p. 93) records the same location towards the rising sun; and Emerson (1909, p. 258) recorded the following sacred *mele* from Hawaii:

"A query, a question,
I put to you:
Where is the water of Kane?
At the eastern gate
Where the sun comes in at *Haehae*
There is the water of Kane."

As Emerson shows, *Haehae* is a portal through which the sun was supposed to enter in the morning.

To the Andean people, Titicaca was not only the original birth-place of the sun, but when Tici-Viracocha founded Tiahuanaco, he let both the sun and the moon ascend to heaven from the sacred island in this great lake. The twin islands of Titicaca and Koati were therefore also known to the early Spaniards as the Island of the Sun and of the Moon. To the Polynesians the great lake in the Fatherland (*Tapu-tai-roa*), as well as the life-giving spring and its pond (*Wai-ola*), were generally referred to as shrines or possessions of the sun-god. But Best (1923 c, p. 105) shows that in Maori mythology the moon also has its birth-place in the water of *Wai-ola a Kane*, pronounced by the Maori as *Waiora a Tane*. White (1889, Vol. I, p. 142) emphasizes this aspect of Maori tradition, and writes: "When the moon dies she goes to the living water of Tane—to the great lake of A-ewa [Wander]—to the water which can restore all, even the moon to its path into the sky."

Kahiki-Ku, whence man reached Polynesia

According to Maori Polynesian tradition, the spring with the sacred life-giving water was reachable even by contemporary mortals *provided they could manage the voyage eastwards across the sea*, to the foreign land towards the sunrise, where it was still located. It was in a land foreign to the present island tribes, but it was "in that ancient, well-remembered, and often-quoted home of the Polynesians ... situated in *Kahiki-ku*, ..." (Fornander 1878, Vol. I, p. 101.)

Kahiki, or *Kahiki-ku* (Sacred Kahiki), is, of all Polynesian allusions to the earliest Fatherland, the name most widely and commonly employed. Kahiki was the mainland home of the first godlike men who became the island discoverers, the home of the Tiki and Taranga family, and the place where true man was created. In Polynesia (as in Peru) the Flood must, however, have antedated the actual ancestral "creation", for a Polynesian legend states that it was not until after that primary man-destroying catastrophe that the survivors in their vessel first "landed and dwelt in *Kahiki-honua-kele*, a large and extensive country." (*Ibid.*, p. 91.)[1] From that initial arrival after the flood—that is through the scene of human creation and all successive events until Maui-Tiki-Tiki and his contemporaries settled the islands in the Polynesian Ocean—did the forefathers of the islanders reside on the great mainland of *Kahiki*, which was said to border directly on the ocean. (*Ibid.*, p. 101, etc.)

We have seen in Part III that in New Zealand and several islands of Polynesia proper—but not in Hawaii—the natives possess distinct traditions to the effect that the secondary invasion of the islands came at the beginning of the present millennium by way of a group of islands termed *Hawaiki*, and located in the north. Thus began the actual Maori-Polynesian period. But before this event, and associated with the gods and god-like men of the earliest legendary island era, we hear the numerous references to the glorious kingdom of *Kahiki*.

Percy Smith (1910 a, p. 216) writes: "I judge from Fornander that the Hawaiians have no tradition of any Hawaiki in the Pacific, but in their word *Ka-hiki* we may probably trace the name *Fiji* as well as *Ta-hiti*." In spite of this relationship in name, none of these three places are geographically identifiable one with the other. From the numerous references to Kahiki-ku it is clear that it is no circumnavigable island, but a sub-division of a vast continent, with ocean only on one side. It is referred to in other Polynesian dialects also as Tawhiti and Tefiti. We may therefore well assume that Fiji (properly: Viti), as well as Tahiti in the Society Group, have both taken their names from this same mythical source, the sacred Kahiki-ku of songs and traditions. In analysing the etymology of this early mythical name, Percy Smith (*Ibid.*, p. 111) came to the following interesting conclusion: "*Ta* is a prefix of a causative nature, *Whiti*, or *Hiti*, is to rise up, as the sun, and also means the east." In fact, all through Polynesia, from Easter Island to Fiji, from Hawaii to New Zealand, we meet the word *hiti*, *viti*, *hiki*, *whiti*, *fiti*, and *iti*, always meaning "sunrise", "east", or "towards the east". Gill (1876, p. 17), and with him also Steinen (1933, p. 19), reached the very same conclusion as Smith on the etymology of this ancient place-name, giving it as a composite of a causative and the Polynesian word for "east".[1]

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[1] We recall as a peculiar aspect of both Peruvian and Polynesian mythology that some people were said to have lived in obscurity and darkness even before the creation of sunlight and the proper ancestral tribes.

Although apparently no-one has denied this significance of the name for the place of Polynesian origins, yet none have said what remains to be said: that through all the numerous allusions to their forefathers living in and coming from *Ka-hiki*, the Polynesians have told us in their own plain words that *they have lived in and come from the east.* "The East" was their former Fatherland.

It may here be inferred that the Polynesian reference to an origin in the *east* might possibly be just as misleading as the westward itineraries of the departing souls (see Part I), as it could be a purely religious conception based on the rudimentary belief in a solar origin of the chiefs. To this we may answer that there is a graphic distinction between Polynesian information pertaining to immaterial spirits and that relating to seafaring ancestors. Those of the Polynesians who let their departed spirits follow in the trail of the setting sun were confident that they would enter the gateway at *Haehae* in the east next morning, and thus find the way to paradise with the sun as guide. But Kahiki itself was only secondarily a tempting home for returning spirits; it was above all a real land, the designation of a distant mountainous mainland bordering on the Polynesian ocean, whence mankind migrated to the present occupied groups. There are even some few legends which claim that certain early heroes made a return visit to Kahiki. As we have just seen (with Best and Thrum) their steering orders were then to direct their bows "to the rising sun". A distinct tradition to this effect is also recorded from the Marquesas, in an account of a visit to *Tefiti*. (*Fiti* is the Marquesan pronounciation of *hiki*, "east", and *te* is their definite article.) In his *Marquesan Legends*, Handy (1930, a p. 131) narrates that a party of "men, women and children" embarked in a double canoe of extraordinary size, which was named Kaahua. Setting out on their long expedition from the Marquesas group "they sailed east, and finally reached a land called Tefiti. Some of the explorers remained at this land, while others returned to Puamau on 'Kaahua'." As there is no land short of Pacific South America to the eastwards of the Marquesas group, Handy was much puzzled by this itinerary for a voyage to Tefiti, but, he stresses, "my informant insisted that this land was toward the rising sun (*i te tihena oumati*)."

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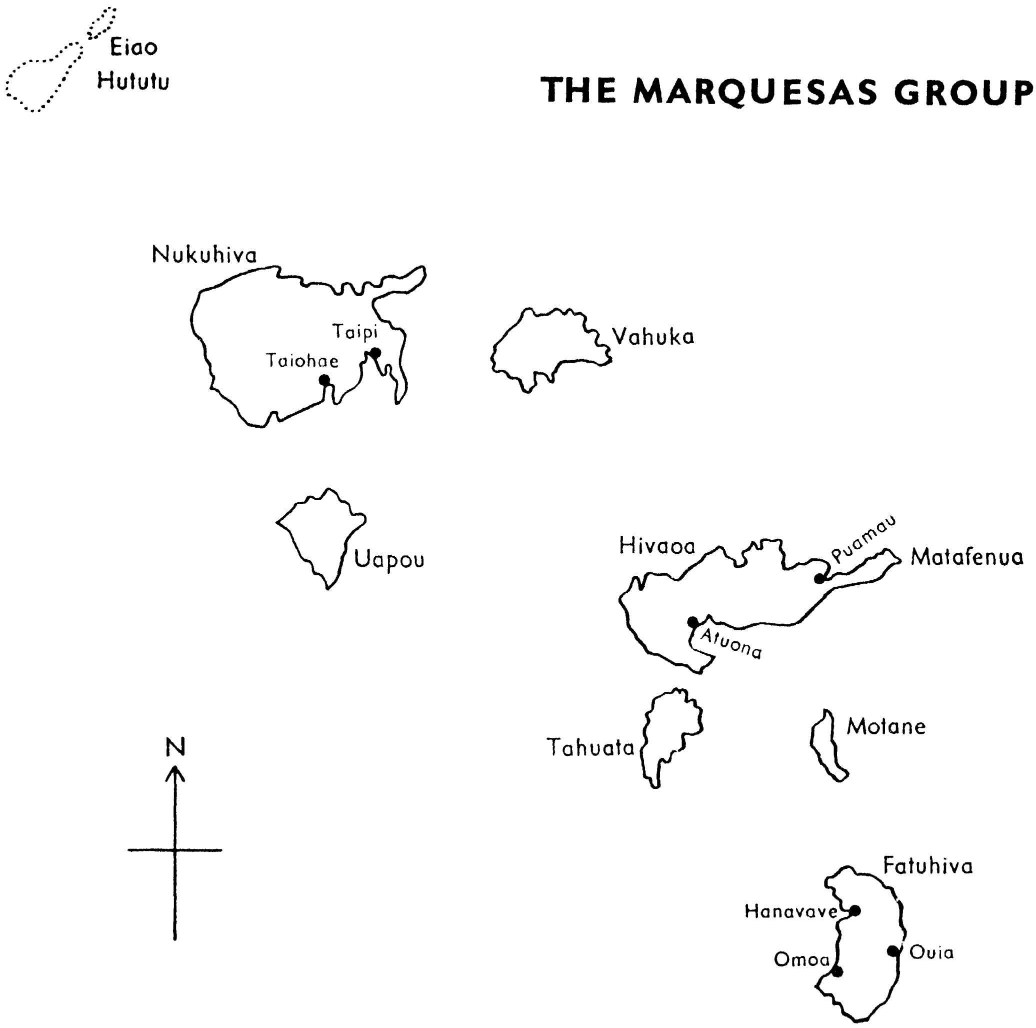
[1] Gill (*loc. cit.*), who received first hand information among the aborigines of the Hervey Islands concerning the etymology of the name Tahiti, wrote: "It is said that the 'spirit' name of Tahiti is 'Iti', i.e. '*iti* nga' = *sun-rising*. Tahiti simply means 'east,' or 'sun-rising,' from *hiti* (our *iti*) to 'rise': *ta* being causative. That island was known in the Hervey Group by the name Iti or 'east': it is only of late years the full name Tahiti has become familiar "



THE MARQUESAS GROUP

Steinen (1933, p. 19) heard the Marquesans referring to the same eastern land as *Fitinui*, "Great Fiti", or the "Great East". They stressed that this Great Fiti was not in the direction of the other Pacific islands, but across the ocean to the *east* of their own group, "beyond the eastern cape of Matafenua." (See inserted map.) Steinen (*Ibid.*) also points to the curious fact that the term *fiti*, which on the other islands means "sunrise", in the Marquesas has a double significance, namely "to go towards the east," and also "to go inland from the coast" or "uphill from seashore". He tries to explain this as having originated from the time of navigation, when "to go towards the east" would be to ascend against the trade wind, a regular uphill movement. This is a very plausible explanation, yet it is not impossible that the double significance of the word has survived from a time when the Marquesans' ancestors lived in that great land to "the East", i. e. Pacific South America, where "to go east" and "to go inland" would actually be one and the same thing.[1]

The name Fiti-nui, or "Great Fiti", which to the Marquesans distinguished the specific Fiti in the east from the smaller islands of Viti (Fiji) and Ta-hiti (Society Island) in the west and southwest, is easily identifiable with the legendary Maori place *Iti-nui*. Percy Smith (1910 a, p. 112) identifies this locality from an old Maori legend: "Iti-nui is the original land from whence we sprang."

As the conception "East" must naturally be relative to the location of the speaker, it is unlikely that *Iti*, *Hiti*, *Viti*, etc. was a real name for the Polynesian Fatherland in its original days. It was probably a descriptive term that could be properly used only after the movement of the Polynesian stock to another locality where the Fatherland actually became "East". *Iti*, *ta-hiti*, *te-fiti*, *ka-hiki*, etc. may therefore possibly have been used by the aboriginal immigrant Polynesians as part of their vocabulaly rather than as a geographical name. It is in either case most noteworthy that the basic word under discussion, *iti*, or "*sunrise*", is the direct Polynesian way of pronouncing *inti*, which in Peru is the specific Inca (Quechua) word for "*sun*".[2]

Since the Polynesian term *iti* means "sunrise" and "east", and the Peruvian term *inti* refers to the "sun" irrespective of its position, we may add that the Mayas refer to "east" and "west" as *likin* and *chikin*. (Morley 1946, map.) We have seen that the present Maori-Polynesian term for the sun itself is *ra* or *la*, and as such it is also used as a poetical name for the former ancestral abode. *Mata te Ra*, literally "Eye of the Sun", is given by Percy Smith (1910 a, p. 76) as a place where the Maori ancestors dwelt in their remote antiquity. This is only a dialect version of the expression *Mata he La*, which Martin (1817, Vol. II) renders as a Tongan term for the "east". Emory (1934, p. 39) also speaks of a Tahitian tradition, "first written down in 1843, of the arrival of migrants forty generations ago in a ship named 'Te-ao-tea' from a land called 'Te-ra' [The-sun]. The Rarotongans call this same mythical land 'Te-ra-ua'."

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[1] It is true that the Polynesians considered an eastward voyage by water-craft as an uphill voyage, and a westward voyage as one going downhill over the ocean surface. Henry (1928, p. 436) states that in regular boasting competitions the Raiateans would try to the best of their ability to belittle Tahiti. "To this retort the Tahitians would reply: 'How can Tahiti be underrated by Raiatea? The setting place of our sun and moon is Raiatea. The recipient of our rubbish is Raiatea. The sun rises over Tahiti, and sets over Raiatea; the moon ascends over Tahiti and sets over there. ... You are indeed below in the west, and we are above in the east here. When Raiateans come to Tahiti, they say they are sailing up, and it is really up. But when they return to Raiatea, they say they are sailing down, and Raiatea is really down from Tahiti.' And so the dispute ended." Fornander (1878, Vol. I, p. 18) also recorded: "In many of the Polynesian groups the expressions 'up' and 'down' (Haw., *iluna* or *manae* and *ilalo*) are used with reference to the prevailing trade-winds. One is said to 'go up' when travelling against the wind, and to 'go down' when sailing before it." The feeling that the Pacific Ocean "slopes down" from east to west was most vividly experienced by the members of the Kon-Tiki raft expedition.

[2] I do not want to stress the point, but do not think it should be entirely overlooked that Tiahuanaco, formerly known as Chukara, was according to Inwards (1884, p. 16) also referred to in ancient times as *Chuqui a Vitu*. Joyce (1912, p. 225) mentions that in southern Peru a god named *Chiqui* [Tici?] was honoured with ceremonial dances. Chuqui-mancu was the title of the powerful and venerated monarchs ruling the valleys between Paracas and Lima right until Inca times. (Garcilasso 1609, Bk. VI, Ch. XXIX.) If *Chuqui* and *Chiqui* were variable spellings of the same name, then *Vitu* and *Viti* would be as closely interchangeable. This is not beyond belief, for the old Peruvians had no letters, and the spelling of the early Spaniards was very approximate when it came to native names. As Bandelier (1910, pp. 334, 62) shows, the early Spanish renderings of 'Titicaca' include the forms *Titucaca*, *Thichicasa*, and, as we have seen (in Part V) *Tiquicaca*. (La Paz was formerly known as Chuqui-apu; Means 1920, p. xiii.)

Kahiki, the Polynesian fatherland

Besides the mere etymology of the name Kahiki, we are left with some interesting information on its general geographical disposition. According to Fornander (1878, Vol. I, p. 133), we learn from numerous references in Hawaiian tradition that the former abode of the Polynesians was "a subdivision of the large continent generally called *Kahiki-ku*, or Eastern Kahiki, and from other references we infer that it was situated in the western part of that continent, ..." From this western side of *Kahiki-ku* voyages by sea were possible directly to the present island settlements, without passing any other island territory en route. (*Ibid.*, p. 135.) Since the Polynesian home was in the *western* part of Kahiki-ku, there was naturally foreign land stretching towards the east, but we do learn that other people lived also to the north on the same mainland, and "to the south of it was a large land or continent called *Ku-i-lalo* or *Honua-ku-i-lalo*, 'the southern land', renowned for its warlike and savage people..." From numerous references in traditions from all over Polynesia, we learn that the Fatherland was a large elevated mountain land. Fornander (*Ibid.*, p. 77) writes: "Among the many other names for this primary homestead or paradise, retained in the chants and traditions, are *Pali-uli*, 'the blue mountain'; ... The tradition says of 'Pali-uli' that it was 'a sacred, tabued land; ...' " From the hight of *Pali-uli* the Polynesian ancestors descended to the ocean.

All through Polynesia there are peculiar references to the occupants of Kahiki having originally dwelt aloft somewhere "up above". Some of these legends claim that the former abode was in the *ani*, *lani*, *rangi*, or *ragi* ("sky" or "heaven") before the ancestors took up their abode down on the islands. Especially noted for this belief are the tribes of the Tokelau Group, who have inherited the belief that the Polynesians' ancestors, or at least their own forefathers, had "descended from the skies." (Stair 1895 a.) In Futuna too the sacred Fatherland was up in the sky, yet it was expressly stated it could be reached by sea. (Burrows 1938, p. 76.) Turner (1861, pp. 244-246) shows that the Samoans also considered the earliest ancestral centre of activity to have been somewhere up in the skies, until the islands were discovered down below by the offspring of the earliest god-men. Even after the islands had first been settled, some ancient hero had managed to reestablish intercourse with the people who still lived in the skies. Thus one named Losi "went up on a visit to the heavens. He found land and sea there, people, houses, and plantations."

This sporadic belief in a descent to the islands by god-men who had dwelt in the skies would not be unnatural to any people provided they had had ancestors who, like the Incas or the Tiahuanacans, had lived on a plain 12 000 ft. above the level of the ocean. Such people were literally high above and among the clouds—living in the sky. Parallel to the belief in a descent to the ocean from a homeland in the skies run the numerous legends and traditions which describe the Fatherland as a cliff or elevated region rising above the sea with lofty peaks and mountain ranges. We have seen that the Hawaiians refer to Kahiki-ku as the "Blue Mountain", and Maori myths are full of similar references. The Tahitians held the belief that far to the east of them, across the ocean, lay the great cliff

O-te-papa, the important Polynesian Earth-Mother. Schirren (1856, p. 38) quotes a Tahitian allegory stating O-te-papa to be the mythical wife of O-Maui, and the origin of all the islands. After creating the sun, and before the birth of mankind, Maui was supposed to have dragged the great cliff of Mother Earth through the empty ocean to place it in the east, in the course of which the Pacific islands broke off. O-te-papa has remained ever since "as a great mainland in the east, where it is still supposed to be today." (*Ibid.*) We recall that it was from the same O-te-papa (otherwise Ko-Papa or Papa) that mankind subsequently spread to the islands.

This Tahitian myth, which shows that the Polynesian Earth-Mother was considered to be located across the ocean to the east,—where it had been in all human times—has not received much attention. Only Mahling (1902, p. 27) comments: "The great land, which according to a Tahitian myth should be located towards the far east, and from which the islands broke off when it was pulled across the ocean, is in no case a reference to America, but only fiction, intended to explain the presence of the islands in a simple way." It is fiction indeed, but it is evidently intended to explain more than the mere *existence* of the islands; it is meant to explain the general layout of the continental Fatherland in relation of the islands.

The idea of an original home on the lofty ancestral cliff in the far east, whether alluded to as *Pali-uli* or as *O-te-papa*, may explain much of the belief in a descent from higher regions down to the islands. But we must nevertheless not forget the implications of the widespread habit all through Polynesia of referring to "east" as "above" and "west" as "below". It is clear that the peculiar custom of using one and the same phrase for both "to go westwards" and "to descend", and another for both "to go eastwards" and "to ascend", must have afforded some ground for confusion among the heirs to the original verbal migration-stories, and some of the references to ancestral "descents" may possibly in the first place only have meant that the voyagers travelled towards the west ("descended") from a Fatherland in the east ("above"). (See ftn. 1 page 746.)

The westbound trade wind and ocean current that gave the Polynesians this peculiar sense of living on islands in a downward-sloping ocean were also used in some of their poems and allegories to point out the direction of the Fatherland. Emerson (1909, p. 37) records a sacred Hawaiian chant that mentions "the swell that rolls from Kahiki from Wakea's age enrolling." Such a permanent swell does only reach Polynesia from America.[1] A phrase in another local chant even specifies the locality in Hawaii which presumably is honoured by receiving these eternal swells most directly from Kahiki (*Ibid.*, p. 191): "...like waves from Kahiki that beat on the front of Kilauea." Kilauea is the great volcano on the east coast of Hawaii, with its wide front to the sea facing South America, while sheltered from the west.

The famous man-god and island discoverer Maui-Tiki-Tiki was one of the principal heroes who dwelt in the Fatherland. As Schirren (1856, pp. 85, 89) shows, this Maui was also master of the winds, *except the west winds*, which were let out by his *enemies*. He was explicitly honoured as "the God of the East Wind, and the winds between Southeast and

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[1] *Wakea* (also *Atea*) is, as we have seen, another symbolic reference to the first divine originator of all royal lines in Hawaii and many other parts of Polynesia, and the meaning of the name is "Light". (Fornander 1878, Vol. I, p. 166; etc.)

Mythical fishing scene in iconographic art from the Chimu territory, North Peru. (From Leicht 1944.)

Northeast." (*Ibid.*) Stimson (1933, p. 22) records from Anaa in the Tuamotus that the creator was there referred to as Kiho, who was still believed to live in the ancient Fatherland. "It was said that the (personal) wind of Kiho's was called the Growth-impelling-gentle-east-wind." The all-dominating winds and swells came from the Fatherland. There are no references in Polynesian legends and traditions to ancestors struggling up against the elements to make their discoveries. But there are plain statements to the contrary. The Society Islanders claim that the early god-men left the Fatherland to take possession of the islands in the following way: "There came a time when the gods mounted upon the wind and were wafted over the ocean..." And: "Upon the winds did the gods fly to Tahiti." (Henry 1928, pp. 443, 444.)[1]

Voyages to Kahiki-Ku, the Eastern Land

Fornander (1878, Vol. II, pp. 278-288) gives considerable attention to an ancient chant or *mele* of a Hawaiian voyager named Kualii, who was said to have managed the visit back to the sacred Fatherland, Kahiki-Ku. The chant was said to be "widely known among the *elite* and the priesthood at the time of Captain Cook's arrival," and Fornander gives the following translation:

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[1] In the western corner of Polynesia, including Tonga, Samoa, and Polynesian-affected Fiji as well as Futuna, Hawaiki-ku is referred to as *Buru-tu*, *Bulu-tu*, *Pulu-tu*, and (in Fiji) *Mbulo-tu*. *Tu* (i. e. *ku*) is the usual suffix to the names of sacred places, and it is possible that the earlier discussed *Uru* or *Ulu* reappears again in the root of this name. Also this Bulu seems to be the home of the Sun-god, and thus located in the east. This may be deduced from the etymology of an ancient name of a Fijian god. St. Johnston (1921, p. 270) writes: "Ratumaibulu, the Fijian god of plentiful harvest and fertility, takes his name 'Mai Bulu' as 'from Bulu'." This Fijian god of harvest and fertility, ***Ratu Mai Bulu*** is none other than *Ra-tu*, the divine sun, and since he too came from Bulu, then Bulu must be in the east like Mata-te-Ra and Kahiki-ku. It is well known from pre-Inca symbolic art that "the serpents are symbolic of the sun's rays" (Verrill 1929, p. 324), and on this basis we may understand the following information also presented by St. Johnston (*Ibid.*, p. 64): "In Fiji the Snake was 'the living shrine of Ratumaibulu'; but to show how traces of the ancient Sun-cult still remained, the rainbow was said 'to spring from off the Snake of Ratumaibulu'." That is, the rainbow sprang from the rays of the Sun from Bulu. Thus in Fiji the rainbow was considered as springing from the "Snake" of the Sun-god, while we have seen from Mangaia that the rainbow was considered to be the "girdle" of the Sun-god. In the Early Chimu art of coastal Peru some of the supreme deities are symbolically ornamented with snakes worn round the waist in the shape of a girdle. Even the Raimondi monolith of Chavin wears a belt round the waist that terminates on either side in a snake's head, and a very similar belt is worn by the main central figure on the "Gateway of the Sun" at Tiahuanaco. It is perhaps not unlikely that this important belt, whether conceived as worn by a god, or actually worn by his royal representatives on earth, may symbolize the snake-headed rainbow-belt of the original Sun-god. This could even explain why the royal persons in Tahiti were referred to as the "wearers of the red belt of Kura."

"O Kahiki; for whom is Kahiki?
For Ku.
O Kahiki, land of the far-reaching ocean,
Land where Olopana dwelt.
Within is the land, outside is the sun;
Indistinct is the sun, and the land, when approaching.
Perhaps you have seen it?
I have seen it.
I have surely seen Kahiki.
A land with a strange language is Kahiki.
The men of Kahiki have ascended up
The backbone of heaven;
And up there they trample indeed,
And look down below.
Kanakas (men of our race) are not in Kahiki.
One kind of men is in Kahiki—
the *Haole* (*white man*);
He is like a god,
I am like a man,
A man indeed..."

This *mele* has caused considerable comment. Fornander came to the conclusion that the voyage of Kualii must have taken place a century or so before Captain Cook discovered Hawaii, that is in a time so recent that the Spaniards would already have arrived among the Aztec and Inca nations. Irrespective of the period when the traditional event may have taken place, the description may give us certain important hints in as much as it deals with a voyage to the Fatherland, the land of the important pan-Polynesian god Ku and the legendary Hawaiian ancestor-king Olopana. In analysing the *mele*, Fornander explains what lies behind the expression "Within is the land, outside is the sun; Indistinct is the sun, and the land, when approaching." He shows that "within" and "outside," or in Polynesian, *iloko* and *iwaho*, "is a peculiarly Hawaiian expression, and, though not much used at present, may have been more prevalent in older times, indicating that the land was to the eastward (resp. westward) of the voyager. One may hear to this day among the native population such geographical terms as 'Kohala-iloko,' 'Hamakua-iloko,' expressing Eastern Kohala on Hawaii and Eastern Hamakua on Maui, in distinction from 'Kohala-iwako,' Western Kohala, etc." By this specific information, Fornander emphasizes, the sacred chant means to tell us that the land of Kahiki is so located that it extends *from* the ocean and *inland towards the east.* Although he looks for Kahiki-ku in Arabia, and thus would expect Kualii to have visited some lands in the Old World, Fornander admits that the chant must refer to "a casual visit" to the American coast. He writes: "I am inclined to prefer the voyage to Acapulco (Mexico) or the American coast, in place of Manilla, from the fact that the chant describes the country as 'having the land within and the sun outside'... Moreover, the word 'aloalo,' which I have rendered as 'indistinct', from its identity with the Tahitian 'aroaro,' 'Indistinct, dark, mysterious,' would seem to apply with greater force to the high mountain land back of the American coast, shrouded in clouds and fogs, than it would to the neighbourhood of Manilla."

If it be correct that the land in question is America, then America is the Polynesian Fatherland. For, as we have said, this was the Kahiki of Ku, and the land where the famous early Hawaiian ancestor-king Olopana had dwelt. The "white man," "like a god," and with a "strange language," observed by the Maori-Polynesian voyager in Ku's and Olopana's former abode, cannot be guessed at unless we know the period of the voyage. Since they had "ascended up the backbone of heaven," to trample there and "look down below," they could have been "Viracochas," but rather those of post-Colombian fame, provided the legend is as recent as Fornander assumes.

Like the voyager Kualii claimed to have seen white men in the Fatherland, so do also a number of other old Hawaiian traditions speak of certain white men (*Haole*) who had come by sea to Hawaii in small craft before the arrival of Captain Cook. This has in some quarters been taken as an indication that Hawaii might have been visited by early Spaniards before Captain Cook's recorded discovery. Fornander (*Ibid.*) even went as far as to touch the possibility that some Spanish galleon might have passed by Hawaii and found Kualii and his company fishing off the coast, carried them off to America, "and brought them back on the return trip." But all these theories were disproven by Dahlgren (1917) in his thorough-going monograph on the question whether the Hawaiian islands had been visited or seen by Europeans before the arrival of Captain Cook, a question which he firmly answered in the negative.[1] Showing that the white men referred to in Hawaiian traditions before the historic arrival of Cook could *not* have been Europeans, Dahlgren (*Ibid.*, p. 145) also characterizes Fornander's hypothesis—of Kualii's visit to America through Spanish 'pick and delivery'—as baseless. But the fact that Europeans had not seen Hawaii at the time of Kualii does not, of course, prevent Kualii from having seen Europeans on his voyage to Kahiki, provided the voyage really took place in post-Columbian time. We should in any case not overlook the following evidence pointed out by Dahlgren (*Ibid.*, p. 149) in his essay:

"Cook's men saw in a house some bits of wood that were worm-eaten; and the natives indicated that they had been cast on land by the waves,—'and we had their own express testimony,' he adds, 'that they had got the inconsiderable specimens of iron found amongst them from some place to the eastward'."

Stokes also (1932, p. 600) discusses a Polynesian legend of a visit to a distant land, supposed to have been accomplished by another early Hawaiian voyager named Kamapiikai. He comments: "The Kamapiikai legend, to me, implies contacts by Hawaiians with a new people enjoying a wealth of unfamiliar objects and material, living in a productive land of previously unknown fruits and having an unfamiliar type of and term for beaches or mud flats well stocked with shell-fish and, in addition, wide sand beaches. The last two are un-Polynesian, except for New Zealand, and the locality for such, nearest to Hawaii, is the American coast." To this the author adds: "The subject must necessarily be speculative, especially since the mysterious land is the Hawaiian Paradise—or one of them—and home of the god Kane." On the basis of this and some of his earlier quoted evidence, Stokes (*Ibid.*) concludes: "As represented above, from the material presented a good case could be made for early Hawaiian-American contacts, and Polynesian theories have been based on less. Equally so, such theories, through weak premises, have handicapped later studies. It will be sufficient therefore to submit the above presentation for examination in subsequent studies or theories of early contacts between Polynesia and America."

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[1] Summarizing all available evidence, Dahlgren (*Ibid.*, p. 213) concluded: "For all these reasons I hold that the question which has been put as the title to this essay must be answered in the negative:—*No historical fact proves, nor is there any sort of probability, that the Hawaiian Islands were ever visited, or even seen, by the Spaniards before their discovery by Captain Cook in 1778.*"

Voyages to Kahiki-moe, the Western Land

To the Hawaiians of more recent times, the ancient term *Kahiki* has in its widest sense gradually assumed a significance equivalent to "abroad," and applicable to all distant land outside the actual Hawaiian group. Kahiki-ku, however, has always been the name reserved for that specific land whence the ancestors came, while Kahiki-moe was said to be another large land or continent west of both Kahiki-ku and the present island habitat. (Fornander 1878, Vol. I, p. 133.)[1] Kahiki-*moe* is translated by Fornander (*Ibid.*) as "Western Kahiki," and literally it would seem to mean the place where the rising sun goes to sleep (*himoe*=to sleep). The Hawaiians presumably acquired their knowledge of this other continent from a westward voyage attributed to the famous legendary explorer Hawaiiloa. According to Fornander (*Ibid.*, p. 135) this early hero, after discovering Hawaii from the Fatherland, set out on a new expedition towards the west. He discovered there some distant land "where dwelt a 'people with turned-up eyes,' *Lahui maka-lilio*, and travelling over this land to the northward and westward, he came to the country called *Kua-hewa-hewa*; a very large country or continent."[2] Degener (1949, p. 194) writes about the same legendary Hawaiian voyager: "An old epic, or *mele*, belonging to the scholar, the native Hawaiian Fred Beckley, describes how the great navigator Hawaiiloa voyaged to the shores of South America and, after a short stay, returned to Hawaii. Incidentally, he also sailed west where he met a people living in 'stinking hovels and eating white pebbles,' presumably rice." Whatever be the basis for this old legend, it is important to note that this poorly esteemed *western* land was not the Fatherland, for the sacred Kahiki-ku was in the opposite direction. As Roberts (1926, p. 244) shows, some of the Hawaiians positively insist that Kahiki-Ku is "the foreign land to the east as distinguished from *Kahiki-Moe*, that to the west."

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[1] Fornander states that the Polynesians migrated to the islands from the *west* coast of the continent Kahiki-ku, and that the continent of Kahiki-moe was still further west.

[2] Fornander (*Ibid.*, p. 135) was so puzzled at finding the fatherland Hawaiki-ku and the foreign continent Hawaiki-moe placed respectively east and west of Hawaii, that he resorted to the theory that these particular legends must have survived from the time when the Hawaiians had had some temporary settlement in the Sunda Islands. This, however, only made the confusion much worse; he had to account for the theoretical existence of a slant-eyed people on the east coast of Africa, for this people, he suggested, might have been seen on a westward voyage by the Hawaiians' ancestors while living in the Sunda Islands. However, the legends state expressly that the westward voyage went from Hawaii and not from anywhere else.

To sum up, the early Hawaiian voyagers seem to have realized from experience that there was an end to the Pacific Ocean both east and west of them. In the distant east was the large and much described continent of Ku and Kane, containing the centre of creation, the water of the Sun-god, and the cradle of the island race. In the distant west was some other vast land of which little was memorized except that its people had turned-up eyes, lived in stinking hovels, and ate a food like "white pebbles".

Hawaiki-nui

While *Kahiki*, without any epithet, gradually came to mean "abroad" in Hawaii, so *Hawaiki* eventually came, among the Maori, to mean simply "Fatherland". The last Maori fleet came, as we have seen, from Hawaiki island in the far north-east, but some Maori traditions also preserve the memories of a much larger Fatherland to the east whence some of their ancestors had migrated into the Pacific long before the actual Hawaiki period and the arrival of the fleet. This large land was distinguished from Hawaiki proper by an epithet, such as *Hawaiki-nui* or *Hawaiki-roa*, the "Great" or "Long Hawaiki", or also *te-paparoa-i-Hawaiki*, "the greatly extending Hawaiki." On this point Percy Smith (1910 a, p. 58) writes in his *Hawaiki The Original Home of the Maori*: "In some of these epithets of the ancient Father-land, it is clear to me that a continent rather than an island is referred to, and this is the description given to me of Hawaiki-nui, by Tare Watere Te Kahu, a very learned member of the Ngai-Tahu tribe, a people that have retained up to fifty years ago probably more of the ancient knowledge of the Maori than any other: 'Hawaiki-nui was a mainland (*Tua-Whenua*) with vast plains on the side towards the sea and a high range of snowy mountains on the inland side; through this country ran the river Tohinga.' "

Peru has just such vast open plains on the side facing the Pacific and the high ranges of the snowy Andes stretch all along its inland side. Through the former Uru plains from Lake Titicaca southwards to Lake Poopo flows the wide Rio Desaguadero. The name Tohinga is based on the same root *inga*, discussed earlier as associated with former sun-worship and long-ears both in the Titicaca region and in Polynesia (with New Zealand). We shall also see that Hawaiki-nui, like Kahiki-ku, is plainly stated to be located to the east. Buck (1938 a, p. 61) renders the ancient "Chant of Kahu-Koka", in which we hear of an ambitious Maori navigator of that name who wanted to steer his gallant canoe "Back to the bays of Hawaiki-nui, And so to Home." He thus prayed to Tawhiri-Matea, father of all Wind-gods[1]: "Arouse thy westerly wind to waft us direct by the sea road to the Homeland, to Hawaiki." His own steering order for Hawaiki-nui is: "Now do I direct the bow of my canoe to the opening whence arises the sun god, *Tama-nui-te-ra*, Great-son-of-the-sun. Let me not deviate from the course but sail direct to the land, the Homeland."[2]

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[1] "Tawhiri-matea is the personified form of winds in general, yet every wind has also its personified form,..." (Best 1924 b, p. 115.)

[2] Gatty (1943, p. 121) renders a similar version as an ancient Maori *karakia*: "Now do I lay the bows of my canoe to the rising of the Sun, nor deviate from there straight to the land, to the Fatherland."

The groups in the east peopled the groups in the west

We have seen in the early part of the present work that Austro-Melanesia and Micronesia lie as gigantic buffer areas between Polynesia and the Asiatic Old World. Polynesian expeditions have penetrated to some depth into their eastern margins, but further west all Polynesian traces disappear. We shall now see that, inside Polynesia also, the inter-island colonization went in the same way from east to west.

If the Polynesians had come through Papua-Melanesia, they would have reached western Samoa from Fiji, but we have seen already that the Polynesian elements in Fiji came the opposite way—*from* Samoa. If, again, the Polynesians had reached their islands from the northwest, from Micronesia, they would have reached Samoa from the Ellis Islands. But the Ellis Islands traditions state that their own ancestors came the opposite way—*from* Samoa. (St. Johnston 1921, p. 125.) South-southwest of Samoa is the Tonga Group. Both Tongan and Samoan traditions agree in naming Samoa as the ancestral home of the Tongans. (McKern 1929, p. 121.) The Tongans even specify Manu'a island in Samoa as the particular point of departure from which the mythical island-fisher Maui-Tikitiki (in Tongan dialect Maui-Kisikisi) and his family set out to discover the Tonga group. (Buck 1938 a, p. 290.) Thus in the western margin of Polynesia Samoa takes the shape of a westerly directed spreading centre, from which Polynesian elements came west to Fiji, northwest to the Ellis Islands, and southwest to the Tonga Group. But local traditions in Samoa itself state that their own long string of islands were originally discovered from the *eastward*. They are most specific in maintaining that Savai'i, their main and westermost island, was first peopled from Upolu, which is further east, that Upolu in turn was peopled from Tutuila, which is still further east, and that Tutuila before that had been peopled from the Manu'a Islands, which is furthest east of all. (Fraser 1897, p. 20.) On Tau, of Manu'a to the far east, tradition states, the first chiefly house was built and named *Fale-ula* ('House of red dawn'). Buck (1938 a, p. 287) states: "Owing to the first settlement of the Tagaloa (Tangaroa) family in Manu'a, those small islands have enjoyed honor out of all proportion to their size and population. ... Nothing annoys the people of the larger island of Tutuila more than to be reminded of the Manu'a myth that Tagaloa made Tutuila as an afterthought to provide a stepping stone between Manu'a and western Samoa."

The migration memories in western Polynesia thus plainly point to an immigration from the east, what was early pointed out by Schurtz (1895, p. 44) with regards to Vaitupu, Tongatabu, and Samoa. The Samoan account of their long string of islands having been discovered from east to west is repeated also by the Hawaiians with regards to their own northerly group. The Hawaiians are very conscious of the geographical pattern of their own long group, of which they sing: "The scattered islands are in a row, placed evenly from east to west, ... "(Fornander 1878, Vol. I, p. 132.) Yet they specifically state that, in the earliest period of the local history when the ancestral gods gave birth to, or fished up, these local islands, they began in the east with Hawaii, then followed Maui, next—after some delay—the turn came to Molokai. After more delay Oahu followed, and subsequently also Kauai and Niihau, all in a consistent succession from the east. (Buck 1938 a, p. 241; Beckwith 1911-12, p. 634.)

Turning next from the extreme north to the extreme south of Polynesia, we have

Mythical fishing scene in iconographic art from the Chimu territory, North Peru. (From Hoyle 1946.)

already shown that Maori traditions specifically record that the earliest New Zealand discoverers came to this southwestern corner of Polynesia from the east, and used the simple steering principle of steering downwind *for the setting sun.* (Best 1925 a, p. 274; etc.) Traditions are even more specific concerning the subsequent Maori immigrants, of whom we learn that they arrived by way of Rarotonga, which also is much farther to the east. (Buck 1929, p. 13; etc.) Now, if we inquire in Rarotonga as to whence this island was originally peopled, we find with Ellis (1829, Vol. I, p. 126): "The traditions of the inhabitants of Rarotonga, one of the Hervey Islands, preserve the most satisfactory accounts, not only of single parties, at different periods for many generations back, having arrived there from the Society Islands, but also derive the origin of the population from the [Society] island of Raiatea. Their traditions according with those of the Raiateans on the leading points, afford the strongest evidence of these islands having been peopled from those to the eastward."

The Raiateans claim that man first came to their island from Opoa, which again is farther east than Raiatea. Ellis (*Ibid.*, p. 111) tells us that a human being named Tii (Tiki), who was the first man made by the gods, and the same person as Taaroa (Tangaroa), had produced the original islanders. "They first resided in Opoa, whence they peopled the island of Raiatea, and subsequently spread themselves over the whole cluster." When the gods first arrived to discover the Society Islands, they were "mounted upon the wind" and thus they took possession of "the lands of the upper border" (Henry 1928, p. 443)—which is the Society Islands' expression for the easternmost section of their group. More than a century ago, when Ellis (1829, Vol. I, p. 126) resided as an early missionary in the Society Group and became intimately acquainted with traditional accounts of local migrations and discoveries, he found that they had all "invariably been from east to west," directly opposite to that to be expected of a migration from the Old World.

We have now gradually come from western, northern, southern and central Polynesia towards the islands of the eastern margin. If also the Society Islanders came from the east they must have come from—or through—the cluster of small atolls and reefs in the Tuamotu Group, which represent the Polynesian facade towards America. Further east, there is only the isolated outpost of Easter Island, where we have seen that the people insist that the island history began with the arrival of colonists from a desert land in the far east, who came by steering for the setting sun, just like the Maori on the other side of Polynesia. (Thomson 1889, pp. 526, 527, 531-533.) East of Easter Island there is no land from which voyagers could set out, except the open desert coast of South America.

The names of Easter Island

Easter Island has three Polynesian names by which it is recognized by the other islanders. All three names have caused much discussion. The one is *Te Pito te Henua*, which Thomson (1889) in his monograph on the island considered to be its principal name, and the meaning of which is "The Navel of the Islands" (*Pito*="Navel"). To the poetic Polynesians this would imply only one thing: Easter Island in the extreme east was symbolically considered the navel of Polynesia, connecting the other islands with *Mother-Earth* in the east. It is the "birth-mark" of the whole island-world further west.[1]

The second name for Easter Island is *Rapa-nui*, or "Great Rapa", as distinct from *Rapa-iti*, or "Little Rapa", which is an island of similar size in the Tubuai Group south of Tahiti. St. Johnston's reasoning on these two names seems logical. He writes of Easter Island (1921, p. 79): "The question of the native name of the island may have some significance—Rapa-iti or Little Rapa lies a considerable distance to the west of it; and a common-sense way of looking at things would be that a people would be very likely to call their first home 'Great so-and-so', and their subsequent home 'New or Little so-and-so', irrespective of the actual size of the islands, even if they were capable of measuring them. This would imply a direction of journey from the East." In Rapa-iti there is in fact a tradition that this island was first discovered by voyagers (women) from Easter Island. (Couteaud 1910, p. 90.) They may have renamed Rapa-iti after their former home, and given their original Rapa the suffix nui.

The third and less commonly used name for Easter Island is *Mata-ki-te-rangi* or *Mata-kiteragi* (Couteaud 1910, p. 89), meaning "Eyes-Looking at Heaven" or "Eyes Facing Paradise" (*Rangi*, *rani*, *ragi* = "sky", "heaven", "Paradise"). It is again very suggestive that this the easternmost of all the hundreds of Polynesian islands should be particularly considered as the one facing heaven or Paradise.

Ojeda (1947, pp. 133, 147), who has made a detailed survey of place-names inside Easter Island, says like Stokes that *Hiti-ai-Rangi* was another native name for Easter Island. It was said to mean "Border of the Heavens" (*Borde de los Cielos*), and was used in the eighteenth and nineteenth centuries by the Easter Islanders who were carried away as slave labourers to the Chincha guano Islands off Peru. But Ojeda believes that the correct term is Mata-ki-te-Rangi, first recorded by De Lapelin. "In the Polynesian traditions, especially in the Tuamotu islands and Mangareva, Easter Island is mentioned with this name."

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[1] The Incas similarly called the ancient capital of their own empire "Navel" (*Kosco*, or *Cuzco*) and Brown (1924, p. 261) asks: "What was the relationship of Te Pito te Henua, 'the navel of the earth', to Cuzco, 'the navel of the world'?" As the island itself was considered the navel of the other groups, so did it also possess a smaller navel of its own, near the original landing-place on the east side. (*Ibid.*, p. 44; Métraux 1940, p. 35.) Brown (*loc. cit.*) writes: "There is a sphere of stone near the great Ahu in La Perouse Bay that is called *Te Pito Kura* [The Navel of Kura]; it is about thirty inches in diameter and carefully tooled, and is considered the navel of the island. And much ingenuity has been expended in getting a meaning for the name of the island from this word; . . ." [For *Kura*, see p. 733 above.]

In view of the unique location of Easter Island as the halfway mark or stepping-stone between Polynesia and the continent in the east, it is truly remarkable that it should be distinguished among the natives themselves by such names as "The Navel of the Lands", "Eyes Facing Heaven", and "Border of the Heavens", or that an island further west should be renamed after this lonely outpost. The Dutch discoverers of the island, who were unable to understand the native language, did not obtain any local name for it, and thus called it "Easter" after the time of their own visit. Métraux (1940, pp. 33-35), who is strongly opposed to all attempts at tracing American elements in Polynesia,[1] argues that it cannot be proved that the Easter Islanders had any name for their own island at all until the European discoverers named it "Easter Island". His theory is that *Te Pito te Henua* and *Rapa-nui* are names given later to Easter Island by the natives from other groups, and subsequently approved by the Easter Islanders themselves because they had no other name of their own. Métraux' supposition does not reduce the value of the names. It matters little *who* gave these names to Easter Island, as it was certainly not done by the *Europeans*. The same author also tries to dispose of the name Mata-ki-te-rangi by suggesting (1940, p. 34): "Mata-ki-te-rangi probably refers to Pitcairn or some other island and has been identified with Easter Island only in recent times." Pitcairn was uninhabited at the time of European arrival, so this cannot be verified or contradicted. The Mangarevans however, have traditions of Mata-ki-te-rangi; they describe it as a high island with poor harbour facilities in the ocean to the eastwards of their own, and they give the name Rapa-nui as that of a place located on the same island. (Laval 1938, p. 14.) There can only be two mountain islands in question east of Mangareva, namely Pitcairn and Easter Island. Pitcairn, as stated, was deserted at the time of European arrival, and its aboriginal name is accordingly unknown. If, therefore, there is any uncertainty as to the identity of this easterly Mata-ki-te-rangi of Mangarevan tradition, then we have only the more reason to be on the alert. For we may note that whether the Mangarevans regarded Easter Island or Pitcairn as the original Mata-*ki-te*-rangi—"Eyes *looking at* heaven"—another early abode still further east bore the name *Mata-rani*, or "*Eyes* of *heaven*," "*Façade* of *heaven*", by the same etymology. Matarani, is an aboriginal settlement of the coast of southern Peru, directly below the highland settlements of Titicaca. The Peruvian "Eyes of Heaven" and the Polynesian "Eyes *looking at* Heaven" thus literally face each other across the sea.[2]

Memories of place-names in the Fatherland

We have seen how names of pre-Inca deities, cult-sites, and aboriginal tribes were carried along in the myths and memories of the earliest Polynesian migrants. We have

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[1] In a comment on the Kon-Tiki expedition he wrote (1951, p. 129): "...it is no use to search among the Polynesian cultures for elements arrived from America, with the exception of the sweet potato."

[2] To the historic Quechua-speaking tribes of Peru, Matarani—like Mauri, Ilo, Taranga, Uri, Tici, etc.—is just an ancient inherited name, untranslateable like so many others. But we have already seen (p. 716) that the present Polynesian word for "heaven" still survives with the same significance, and partly in an identic, partly in a related form, among continental tribes further inland.

Peruvian deity riding his heavenly reed-balsa through the sky. Below is the symbol of a Chimu house (From Kutscher 1950.)

also seen that Maui-tiki-tiki's home port in the Fatherland, *Ilo*, still survives as the aboriginal name of the best port on the Pacific coast below Tiahuanaco. At the same time names like Mauri and Tiquirani are preserved as place-names in the highlands on the way directly from Ilo to Tiahuanaco. A name like Tiquirani, (pronounced Tikirani) is—like Matarani down below—so conspicuously Polynesian in its entire construction that a further study of ancient native place-names in the Titicaca region would seem worth while.

A few plain place-names are preserved in the Polynesian memories describing the continental Fatherland. Percy Smith (1910 a, p. 58) records a very ancient New Zealand tradition concerning the extensive *paparoa*, where men had their origin and growth, until they spread from there spreading directly to the islands of the great ocean and dwelling there, as the legend states. The tradition enumerates the following names which were said to be mountains in that most ancient habitat: [1] *Tawhiti-nui*, [2] *Apaapa-te-Rangi*, [3] *Tipua-o-te-Rangi*, [4] *Hikurangi*, and [5] *Tawhito-o-te-Rangi*.

[1] We have already seen that *Tawhiti-nui* (also *Kahiki-nui*, *Fiti-nui*, *Iti-nui*) is not only a mountain but a general allusion to the whole mountainous Fatherland in widespread areas of Polynesia, and that it means "The-Great-Sunrise". The other four names all share the common suffix *rangi*, "heaven", but otherwise they appear to be proper names of places rather than sacred descriptive forms.

[2] *Apaapa-te-Rangi* is undoubtedly a reference to the same place in Kahiki-Ku referred to by the Hawaiians as *Kapa-kapa*, which Fornander (1878, Vol. I, p. 133) thought might have been "an old intensive, duplicated form of the Cushite *Zaba*." But since it was a mountain in the Fatherland, Kapa-kapa or Apaapa is perhaps more suggestive of *Caca'aca*, the ancient name of the mighty 20 000 ft. mountain rising above the Titicaca plateau to the north of Tiahuanaco. Between this mountain and the ruins we find a similarly con-

structed place-name in *Patapatani*. Here again we have the ending *ani* which, like *rani*, so frequently applies to place-names in this area. We have repeatedly seen that in Polynesia *ani* and *rani* are local dialect forms of *rangi*, "heaven", and that the same word *ani* also reappears with the same meaning "heaven" among the Paikoneka and Bauré jungle-tribes, inland from Tiahuanaco. It is therefore reasonable to assume that the four place-names with the Maori ending *rangi*—which in the Marquesas Group would be pronounced as *ani*—should be looked for with the ending *ani* in present-day South America also. [3] On this assumption we may identify the legendary Maori name, *Tipua-o-te-Rangi*, with *Tipuani*, another great mountain and village east of Titicaca. [4] We now come to the next name, *Hikurangi*, frequently found in the legends of the Polynesian Fatherland, the island immigrants applying it to various parts of their new domain, such as *Hikurangi* village on the northern peninsula of New Zealand and *Iku Rangi* mountain on Rarotonga. The island discoverer Maui is supposed to be buried on the *Ikorangi* mountain near the East Cape of New Zealand. (Polack 1838, Vol. II, p. 227.) Knowing the letters H and S to be interchangeable in the various Polynesian dialects (e. g. Hawaii, Savaii) we find the root Hiku reappearing as *Siku* in *Sikuani*, which again takes us straight to the Titicaca plateau. Sikuani (Sicuani) is namely a major mountain settlement on the ancient road between Titicaca and Cuzco. In the mountains next to Sikuani lies *Makusani* (Macusani), and noting here too the same suffix, the present author suspected that also this name might have spread, like Sikuani, to New Zealand. By looking up the index to geographical names in *Handy General Atlas*, I found immediately *Makurangi*, which proved to be a place on the same New Zealand peninsula where Hikurangi was located.

[5] The last of the legendary names, *Tawhito-o-te-rangi*, seems to be without a direct counterpart in Andean Peru. But it is perhaps possible that the root in Ta-*whito*-o-te-rangi can be identified with *Pito*-Hiti, "Pito of the Sunrise," which in other Polynesian legends is remembered as a very high mountain in the Fatherland, and occasionally referred to as *Piko-Piko-i-Whiti, and also as Pipiko-nui*. The latter place is even expressly stated to be in the far east, and in the homeland of the sweet potato. (See p. 435 above.) The root of this legendary place reappears in *Pikoani* (Picoani), which again is in the Andean range east of Titicaca.

The Hawaiians also speak of *Hala-hala* and *Pola-pola* as places in *Kahiki-ku* (Fornander 1878; Emerson 1909, p. 188), and through known Polynesian letter-changes they reappear as *Sarasara* and *Coracora* in the Peruvian highlands between Sicuani and the coast. Fornander also lists *Ololo* as a principal place inside Kahiki-ku. Again, *Oruro* is one of the principal early provinces and settlements on the plateau to the South of Tiahuanaco.

In naming their homes, the Marquesan islanders in particular have shown a pronounced predilection for the prefix *Hana*, which in some parts of the group appears in the names of almost every settlement. Fornander (1878, Vol. I, p. 12) noted the significance of these *Hana*-names in Polynesia, and wrote: "*Hana*; name of numerous districts and lands in the Hawaiian, Marquesas, and Tahitian groups, ... refer themselves ultimately, doubtless, to *Sana*, one of the ancient Cushite emporiums in Southern Arabia." To this we may add that *Sana* is also a place-name in the heart of the Chimu territory of coastal Peru, which, as usual, makes a direct diffusion from an antipodal region like Arabia a rather unreasonable alternative. But what seems to be of more significance is the fact that, in aboriginal Peru, *Hanaj* or *Hanak* was the prefix for "Heaven" as opposed to "Hell". In the Quechua language, where *Pacha* means "world", we find *Hanaj Pacha* (or *Hanac Pachac*) to mean "the heaven, the Paradise", while *Uku Pacha* means "the underworld, the Hell." (Middendorf 1890.) It would be very natural for native voyagers from early Peru to honour favourite island settlements with such a prefix.

The migration of place-names

A custom common to emigrants of many races and nations is that of renaming places in a newly discovered habitat after those in the former homeland. A diffusion of geographical names, therefore, often presents a clue of some value to the tracing of ethnic movements. Quite apart from all mythical and traditional material discussed above, we find that a considerable number of Polynesian place-names are identical with, or closely related to, native place-names surviving in the Tiahuanaco territory and adjoining parts of aboriginal Peru. The following sample of forty-four place-names from within the borders of the old Inca Empire, most of them from the heart of the Tiahuanaco area, reappear as aboriginal place-names also within Polynesian territory (Polynesian versions in brackets):

ACARI	(AKARI)
ACHIRI and TAQUIRI	(TAHIRI)
APLAO	(ALAO)
APURIMAC	(APOLIMA)
ARAPA	(RAPA)
ARICA	(KARIKA)
ATICO	(ATITU)
CALAMA	(KALAMA)
CALANA	(KALANA)
CAMANA	(TAMANA)
CAPIA	(APIA)
COROCORO	(KORO)
CORACORA	(PORAPORA)
ILO formerly HILO	(HILO)
HUARA	(HUARA-RAI)
HUATA	(TAHUATA)
KEA	(KEA)
KEA-KEA	(TEA-TEA)
KILI	(KILI)
KONA	(KONA)[1]
LAMPA	(RAMA)
LARO	(RARO)
LOA	(LOA)

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[1] *Kili*, as here referred to, is the ancient settlement of that name on the shore of Lake Titicaca. *Kona* is the southwest portion of Titicaca Island and also the southwest portion of Hawaii. *Kona* means "Southwest" in Polynesia, and *Tonga* is the very same word.

LOCUMBA	(ROTUMA)
MACA	(MAKA)
MACUSANI	(MAKURANGI)
MALA	(MALA)
MATACANE	(MATAKANA)
MATARANI	(MATA-KITE-RANGI)
MAURI	(MAUI)
MOCOMOCO	(MOKO)
OROYA	(OROUA)
PAKAYA	(WAKAIA)
PANGO	(PANGOPANGO)
PISCO	(PIKO)
POTOPOTO	(POTO)
PUNA	(PUNA)
ROMA	(ROMAROMA)
SICUANI	(HIKURANGI)
TAIPI	(TAIPI)
TANGA	(TANGA)
TARACA	(TARAKA)
TARAPOTO	(TAKAPOTO)
TARAPACA	(TARAPAKU)

This list could be considerably extended. We find in the immediate vicinity of Tiahuanaco a striking number of other place-names so Polynesian in structure that they might have been taken from a Pacific Island map; e. g.: *Akapana*, *Pariti*, *Koa*, *Kenata*, *Kurupata*, *Kanapa*, *Taipunu*, *Kupana*, etc.[1]

Borrowed words

We know that the languages spoken by the bearers of the extinct Tiahuanaco culture and their contemporaries were not the same as those recorded in Peru at the coming of the 16th century Spaniards. It is dangerous even to guess at the linguistic relationships or differences between such unidentified prehistoric groups as the early Tiahuanaco, Pucara, Chavín, Early Chimu, Paracas, or Early Nazca. Even if their speech had been inspired by a more or less common source, as their cultures have probably been, we have no means to-day of identifying the tongue of a migrant who was active in South America only in antiquity or at the opening of the mediæval ages. To judge from the physical aspect of the bodily remains, we may well suspect that the language at least of the Caucasian-like elements differed from that (or those) of the general type of Indians among whome they were active. These Caucasian-like elements did not survive until historic or even Inca time in Peru, but we have seen that some of them may have survived as racial components in the Pacific island population. In the subsequent millennium before the 16th century arrival of the Spaniards, even most of the aboriginal pre-Inca Peruvians of the permanent local population changed—or completely lost—their speech material from the early Middle Ages. We know that the Incas, in their recent period, had introduced their own Quechua language into vast areas of northwestern South America where other languages had formerly been spoken. A number of important tongues in the highlands and along the Pacific coast were extinct, partly for this reason, well before the coming of the Spaniards. Some others have been lost in subsequent centuries, before very much, if anything at all, had been preserved in writing. (Cfr. Mason 1950.)

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[1] The tributary of the Amazon which rises near Tiahuanaco leads a downstream traveller to settlements like *Makakana* and *Matakura* on the far east coast, whereas *Matakana* and *Mata'ura* are Maori place-names in New Zealand. *Matatula* is also a principal east cape in Samoa. [We may add with Hornell (1931, p. 349). "In passing it is interesting to note that Monsieur Le Brunnec, a Breton settled in the Marquesas Islands, and who, having married a Marquesan lady, is exceedingly well versed in the language of the islands, is convinced that numerous place names in South America are related to words in the Marquesan dialect of Polynesia."]

The many theories which attempt to link together some of the entirely distinct languages of tribes now living in northwestern South America are so uncertain and hypothetical, that comparative linguistic studies involving also unidentified peoples of the earliest centuries A. D. cannot be but purely speculative, and based on other material than language. Through archæology and Inca mythology we can gain some knowledge of the people and cultures of outstanding importance that flourished in Peru in early pre-Inca centuries. In many cases Inca culture has borrowed ideas and elements from the earlier local civilizations, and in such cases we are often supplied with further hints of what went on in pre-Inca Peru. But the Inca did not borrow their *language* from the same predecessors, on the contrary, it is known they brought their own tongue, and enforced it wide and far in the Andes. We have seen that the *Inca* did not migrate into the Pacific. At the most they sent casual merchant or exploring expeditions to pay visits to the already populated islands. We shall therefore gain very little by comparing the living tongues of the historic populations in Peru and Polynesia. Yet this has frequently been done, and those who have attempted it have derived to very contradictory conclusions. Most have admitted that there is a frequent cropping up of what may seem to be "borrowed words" within both areas, but without any obvious relationship in the structures of the known languages. As Verrill (1929, p. 12) states: "...there is the undeniable fact that among nearly all the tribes of western South America we find words—not one or two but scores—which are strikingly like and in many cases identical with words of the same meaning in Oceanian dialects." We have already run into examples of this in the present work, e. g.: *kumara : kumara* (sweet-potato), *ani : ani* (heaven), *unu : unu* (water), *Tici : Tiki* (creator-god), etc. There has been a tendency among most anthropologists to criticize such unorthodox observers as have kept on comparing Peruvian and Oceanian speech material and insisted that there must have been a former connection between the two areas. [Such as Rivet (1926; 1928; 1943; etc.), Imbelloni (1926 a; 1926 b; 1926 c; 1928 a; 1930 b; 1940), Stucken (1927), with various works by Gallatin, Barreiro, Hallier, Thomas, Wilson, Palavecino, etc.] The critics have felt that such conclusions were hasty and based on too vague linguistic premises. And from the point of view of philology alone they were probably justified in their scepticism. But neither is philology the science which will solve the problems behind the dumb monuments of Tiahuanaco or San Augustín. The critics leave themselves open to an equally justified attack when they go to the opposite extreme and plead that the absence of a convincing linguistic unity in our day proves that the soil of Peru and Polynesia can *never* have been throdden by men of the same race or tribe. This indeed, is to conclude too much from negative evidence, and when transferred to other geographical territories in the world with known racial displacements (e. g. historic North America), we find such reasoning worthless. There is ample evidence of "borrowed words" in the Pacific basin—words which in space have travelled from one tribe to an alien neighbour and in time from one tribe to an alien successor. It is certainly dangerous to depend on borrowed words alone for the reconstruction of race-mixtures and migrations up- and down-wind in the Pacific. But the mere fact that they do exist when Polynesian speech is compared with present-day tongues in Peru, would make language seem to provide a better argument for the diffusionists than for the isolationists, although, when considered alone it is not conclusive for either.

Rivet writes (1928, p. 583), and also repeats (1943, p. 113): "It is a known fact that a close resemblance exists between certain words of the languages of the western slopes of South America and the languages of Oceania, notably that of Polynesia." From this geographical layout he, and nearly all those who have made similar observations, have concluded that the explanation could be found only in an up-wind diffusion from Polynesia to Peru. One of the very few exceptions have been Stucken (1927). He held, on purely linguistic grounds, that a connection must have existed "at some time" and "in some way" between ancient Peru and Polynesia, yet he added: "The assumption that certain South American people may have immigrated from across the Pacific is met with the equally justified assumption that the Polynesians may have originated in America. The linguistic kinship lends support to the one view no more than to the other."

Stucken thus admitted an alternative possibility consistantly overlooked by others, but he could have gone even further. For "*Tiki*" was worshipped as a creator-god and the beginning of things in Peru long before the Polynesian stock carried his worship into the ocean—and "*kumara*" was known as a crop plant in Peru ages before the Polynesian god-men brought it along from the plantations in the Fatherland to their new settlements on the East Pacific islands. In general: man spoke in Peru—in the hills and valleys and all along the open beaches—when no word had yet been uttered inside the roaring breakers of Polynesia.

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Abbreviations:

Abh. = Abhandlungen
Acad. = Academy, Academia
Adv. = Advancement
Agr. = Agricultural
Anal. = Anales
Ann. = Annual, Annali
Anthrop. = Anthropology, Anthropological
Anthropol. = Anthropologist
Amer. = American, Americana
Arch. = Archiv
Archae. = Archaeology, Archaeological
Architect. = Architecture
Arg. = Argentine
Ass. = Association
Ber. = Berichte
Biol. = Biology
Bol. = Boletin
Bot. = Botanical, Botany
Bull. = Bulletin
Bur. = Bureau
Ci. = Ciencias
Coll. = Collections
Comp. = Comparative
Conf. = Conference
Congr. = Congress
Contr. = Contributions
Diss. = Dissertation
Econ. = Economical
Ed. = Edition, Edited
Ethn. = Ethnology, Ethnological
Exp. = Experimental
Fören. = Förening
Förhandl. = Förhandlingar
Gard. = Garden
Gen. = General
Geogr. = Geographical
Geol. = Geological
Ges. = Gesellschaft
H. = Häfte, Heft
Handl. = Handlingar
Harv. = Harvard
Haw. = Hawaiian
Herb. = Herbarium
Hist. = History, Historical, Historia
Ibid. = Ibidem (i.e.: in the same place)
Inst. = Institute
Int. = International
Jg. = Jahrgang
Jour. = Journal
Kgl. = Königlich
Kl. = Klasse
Leafl. = Leaflets
Linn. = Linnean
Loc. cit. = Loco citato (i.e.: in the place cited)
Mag. = Magazine
Med. = Medical, Medicine
Meddel. = Meddelande
Mem. = Memoir
Misc. = Miscellaneous
Mitteil. = Mitteilungen
Monogr. = Monograph
Mus. = Museum
Nac. = Nacional
Nat. = Natural, Naturales
N. F. = Neue Folge
N. S. = New Series
N. Zeal. = New Zealand
Occ. = Occasional
Pac. = Pacific
Philos. = Philosophical
Phys. = Physical
Polynes. = Polynesian
Proc. = Proceedings
Pt. = Part
Publ. = Publication
Rec. = Records
Rel. = Relations
Rept. = Report
Res. = Research
Rev. = Review, Revue, Revista

Roy. = Royal
Sci. = Science, Scientific
Ser. = Series
Soc. = Society
Spec. = Special
Stud. = Studies
Suppl. = Supplement
Tech. = Technology
Trans. = Transactions
Transl. = Translation
Trav. = Travaux
Trop. = Tropical
Univ. = University
Ver. = Vereines
Verh. = Verhandlungen
Vet. = Vetenskap
Vol. = Volume
Wash. = Washington
Wiss. = Wissenschaften
Ztschr. = Zeitschrift

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